

National Grid SA-COA **PRODUCTION FILE**

Contractor : ABB Contracting Co.

Project : SS 8709- 132/13.8kV in Alkha

Contract No : 11131113/00

Substation : 8709

**Subject : 132kV Bus Coupler-A +R13
Relay Panel**



A



POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

B

C

CONTRACTOR : ABB Contracting Company
CLIENT : National GridSA
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY
SUBSTATION : S/S 8709
CONTRACT NO. : 11131113/00
TITLE : Assembly Drawing – +R130 [BUS COUPLER]



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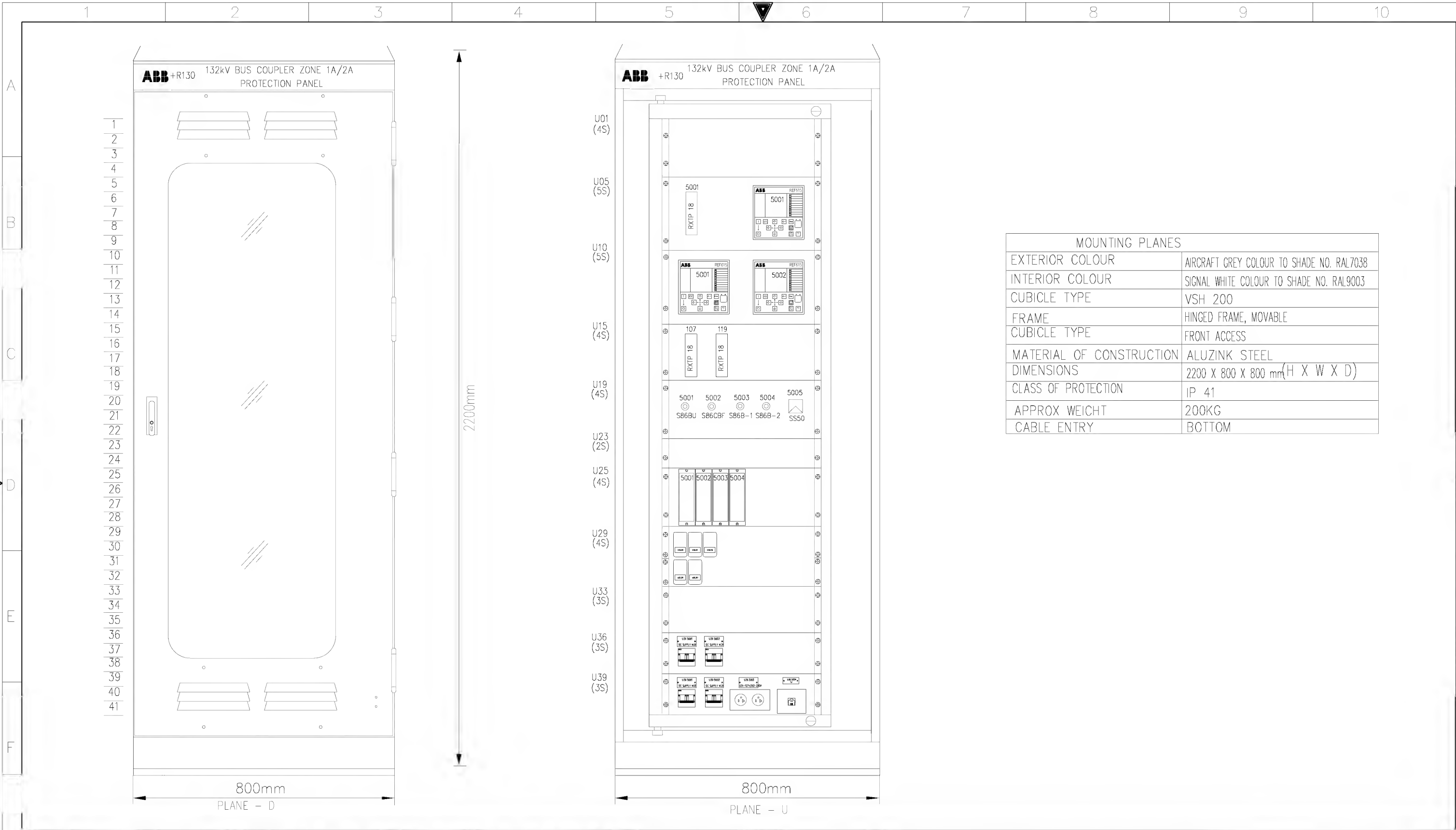
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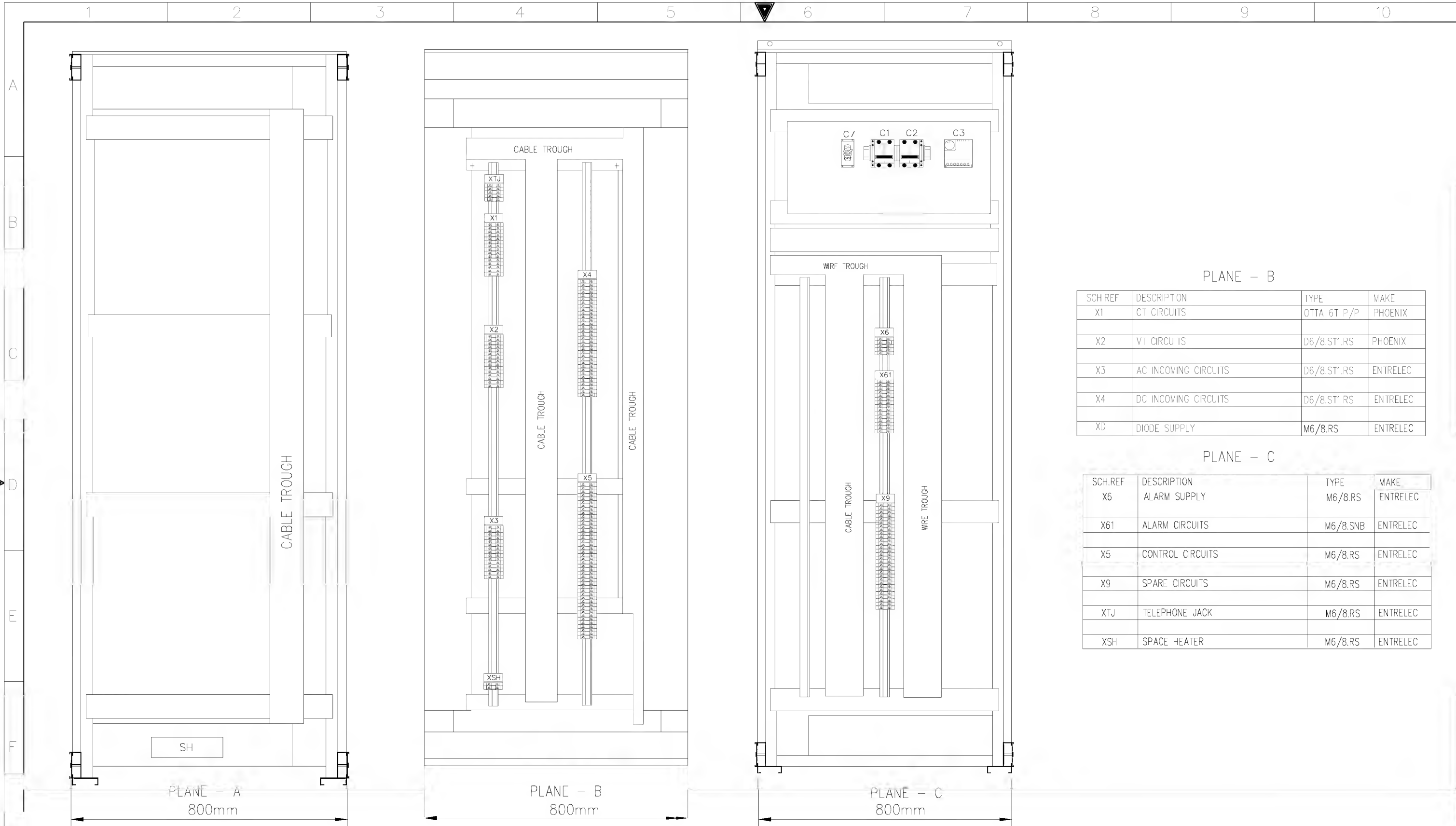
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|------------------------------|-------|-----------------|--------------------------|-------------------------|-----------------------|----------------------|-------------|--------------------------------------|--|---|-------|-----------|----------------|--|-----------|-------|----------|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | COVER SHEET | | | <div>الشركة الوطنية لنقل الكهرباء</div> <div>نقل الكهرباء</div> <div>National Grid sa</div> | | | | | | | |
| 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ | | CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. |
| 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 | | DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | CD-322945 | | SHT | CONT. | |
| REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | | - | C421 | | | G00 | G01 | 01 |





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|------------------------------|--|--|--------------------------|--|-------------------------|--|------------------------------------|--|---|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | ASSEMBLY DRAWING | | <div>نقل الكهرباء</div> <div> الشركة الوطنية لنقل الكهرباء</div> <div>National Grid sa</div> | |
| | | | DRAWN BY RIZ | | CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | |
| 01 13 49 | | | FACTORY ASBUILT | | DATE STARTED 24.01.2013 | | DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | |
| 00 13 04 | | | FOR APPROVAL | | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | |
| REV. NO. | | | DATE | | DESCRIPTION | | INDEX | | PLANT NO. | |
| | | | | | | | - C421 | | CD-322945 | |
| | | | | | | | G01 | | G02 | |
| | | | | | | | | | 01 | |



PLANE – B

| SCH REF | DESCRIPTION | TYPE | MAKE |
|---------|----------------------|-------------|----------|
| X1 | CT CIRCUITS | OTTA 6T P/P | PHOENIX |
| X2 | VT CIRCUITS | D6/8.ST1.RS | PHOENIX |
| X3 | AC INCOMING CIRCUITS | D6/8.ST1.RS | ENTRELEC |
| X4 | DC INCOMING CIRCUITS | D6/8.ST1 RS | ENTRELEC |
| XD | DIODE SUPPLY | M6/8.RS | ENTRELEC |

PLANE – C

| SCH.REF | DESCRIPTION | TYPE | MAKE |
|---------|------------------|----------|----------|
| X6 | ALARM SUPPLY | M6/8.RS | ENTRELEC |
| X61 | ALARM CIRCUITS | M6/8.SNB | ENTRELEC |
| X5 | CONTROL CIRCUITS | M6/8.RS | ENTRELEC |
| X9 | SPARE CIRCUITS | M6/8.RS | ENTRELEC |
| XTJ | TELEPHONE JACK | M6/8.RS | ENTRELEC |
| XSH | SPACE HEATER | M6/8.RS | ENTRELEC |

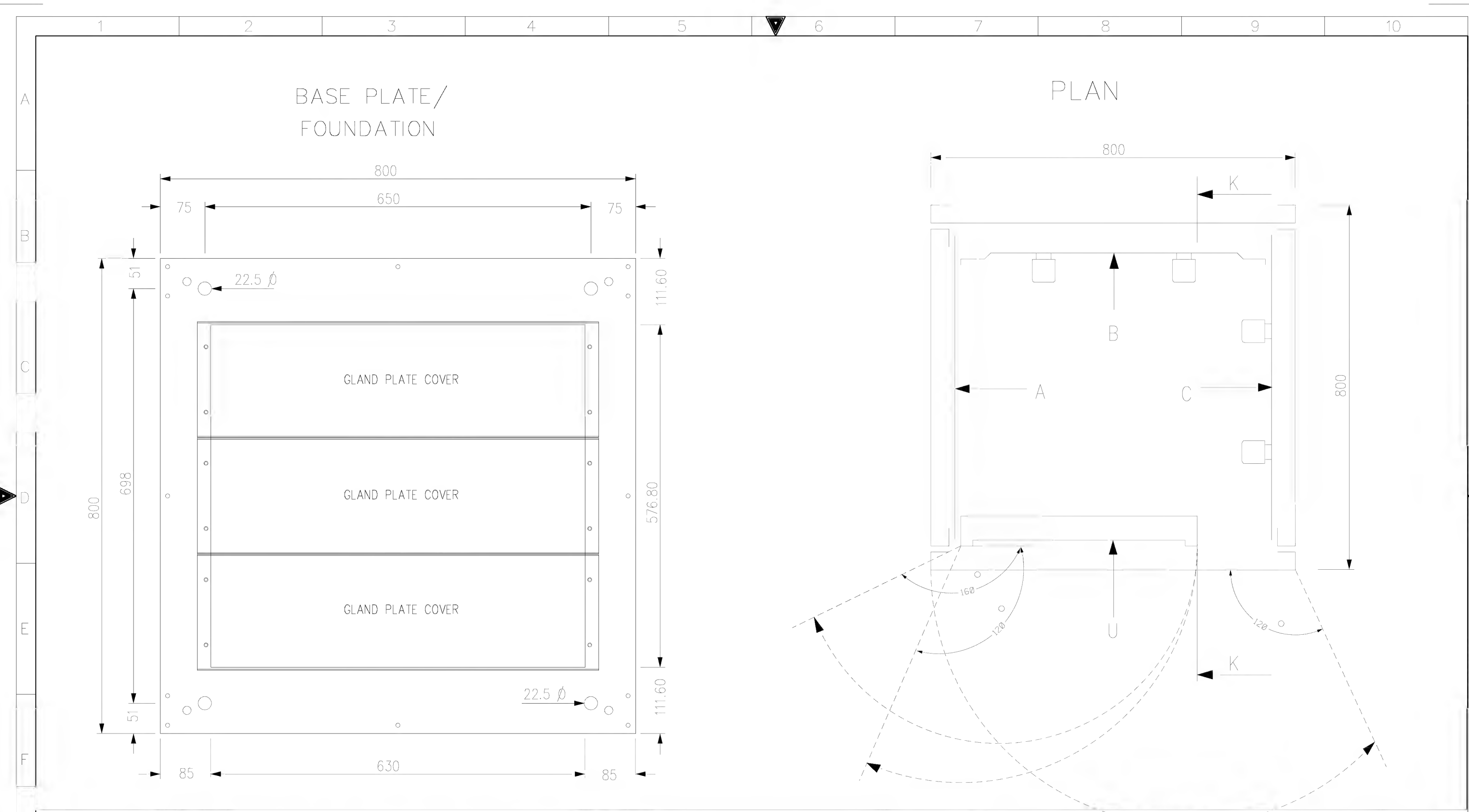
AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | | | |
|----------|-------|-----------------|-------------------------|----------------------|
| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED _____ |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

ASSEMBLY DRAWING
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
National Grid sa

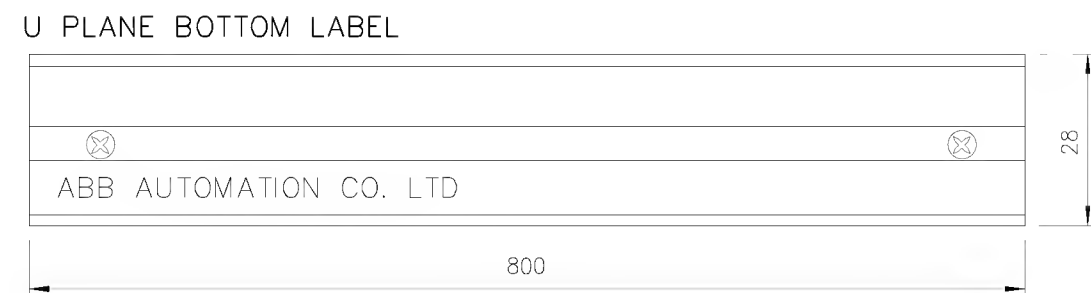
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
|-------|-----------|----------------|-----------|----------|
| - | C421 | CD-322945 | SHT CONT. | 01 |
| | | | G02 G03 | |



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|------------------------------|-------|---------------------------------|--------------------------|--|-----------------------|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | |
| 01 | 13 49 | FACTORY ASBUILT FOR APPROVAL | DRAWN BY RIZ | | CHECKED BY JKR | |
| 00 | 13 04 | | DATE STARTED 24.01.2013 | | DATE COMPLETED _____ | |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | |


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|--------------------------------------|--------------|
| ASSEMBLY DRAWING | |
| 132kV BUS COUPLER ZONE 1A/2A +R130 | |
| S/S 8709-132/13.8KV IN AL-KHARJ CITY | |
| RIYADH | SAUDI ARABIA |


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|------------------------------|-----------|----------------|--|-------|----------|
| الشركة الوطنية لنقل الكهرباء | | |  نقل الكهرباء National Grid sa | | |
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | | REV. NO. |
| - | C421 | CD-322945 | SHT | CONT. | 01 |
| | | | G03 | G04 | |




MANUFACTURING LABEL


| | |
|-------------------------------------|------------------------------|
| ABB | |
| ABB Automation Co.Ltd. | |
| PROJECT : | National Grid SA S/S 8709 |
| ORDER REFERENCE : | 2875 RF S13656 |
| YEAR OF MANUFACTURE: | 2013 |
| PANEL NO. : | +R130 |
| DRAWING NO. : | S13656-CD-322946 |
| MADE IN THE KINGDOM OF SAUDI ARABIA | |

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|------------------------------|--|--|---|--|--------------------------------------|--|---|---|--|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | <div> <div>  <div> <div>نقل الكهرباء</div> <div>National Grid sa</div> </div> </div> <div> <div>الشركة الوطنية لنقل الكهرباء</div> </div> </div> | | | |
| | | | DRAWN BY <u>RIZ</u> CHECKED BY <u>JKR</u> | | ASSEMBLY DRAWING | | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | |
| 01 13 49 FACTORY ASBUILT | | | DATE STARTED <u>24.01.2013</u> DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO. | | |
| 00 13 04 FOR APPROVAL | | | OPRG. DEPT. <u>CTPD</u> ENG. DEPT. <u>AUT-PSAC</u> | | RIYADH SAUDI ARABIA | | | - C421 CD-322945 G04 L00 01 | | |
| REV. NO. DATE DESCRIPTION | | | | | | | | | | |

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| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A |  | | POWER SYSTEMS NETWORK MANAGEMENT PROTECTION AND SUBSTATION AUTOMATION SYSTEMS WBS NO: S-13656 | | | | | ABB AUTOMATION COMPANY LTD 414, AL-KHARJ ROAD SECOND INDUSTRIAL CITY RIYADH-11383 K.S.A | | |
| B | | | | | | | | | | |
| C | CONTRACTOR : ABB Contracting Company | | | | | | | | | |
| | CLIENT : National Gridsa | | | | | | | | | |
| D | PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY | | | | | | | | | |
| | SUBSTATION : S/S 8709 | | | | | | | | | |
| E | CONTRACT NO. : 11131113/00 | | | | | | | | | |
| F | TITLE : List Of Apparatus – +R130 [Bus Coupler-A] | | | | | | | | | |

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|---|------------------------------|-------|--------------------------|-------------------------|---------------------|--------------------------------------|---|-----------|----------------|-----------|-----------|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656 | COVER SHEET | |  نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR | 132kV BUS COUPLER ZONE 1A/2A +R130 | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED | S/S 8709-132/13.8KV IN AL-KHARJ CITY | - | C421 | CD-322945 | SHT L00 | CONT. L01 |
| | REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC | RIYADH SAUDI ARABIA | | | | | 01 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---------|----------|-----------|--|------|------|--------------------|-----------------|--|------------------|
| A | | | | | | | | | | |
| | SR. NO. | GA REF. | SCH. REF. | D E S C R I P T I O N | SHT. | QTY. | TYPE | MAKE | ORDER INFORMATION | ORGIN OF COUNTRY |
| | 5 | U19.5001 | S86BC | PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS FOR RESET OF LOCKOUT RELAY (86BU) | 234 | 1 | MP1-10B MCBH-20 | ABB | 1SFA 611 100 R1006 1SFA 611 605 R1102 | SWEDEN |
| | 6 | U19.5002 | S86CBF | PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS FOR RESET OF LOCKOUT RELAY (86CBF) | 276 | 1 | MP1-10B MCBH-20 | ABB | 1SFA 611 100 R1006 1SFA 611 605 R1102 | SWEDEN |
| B | 7 | U19.5003 | S86B-1 | PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS FOR RESET OF LOCKOUT RELAY (86B-1) | 276 | 1 | MP1-10B MCBH-20 | ABB | 1SFA 611 100 R1006 1SFA 611 605 R1102 | SWEDEN |
| | 8 | U19.5004 | S86B-2 | PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS FOR RESET OF LOCKOUT RELAY (86B-2) | 277 | 1 | MP1-10B MCBH-20 | ABB | 1SFA 611 100 R1006 1SFA 611 605 R1102 | SWEDEN |
| | 9 | U19.5005 | SS50 | SELECTOR SWITCH, 2 POSITIONS, 4 STACKS. FOR INST. PROTECTION IN/OUT SELECTION | 234 | 1 | R20 2/4 | COM ELECTRIC | R193L-204-27-07-04-20322 | |
| C | 10 | U25.5001 | 86BC | TRIP UNIT (86BU) COMPRISING OF: TRIPPING RELAY : HIGH BURDEN TYPE AUX.VOLTAGE : 110-125V DC CONTACTS : 8NO + 2NC FLAGING : STANDARD HAND RESET CONTACT MECHANISM : HAND&ELECTRICALLY-RESET | 234 | 1 | MVAJ105 | ALSTOM | MVAJ105 RA0802A | UK |
| | 11 | U25.5002 | 86CBF | TRIP UNIT (86CBF) COMPRISING OF: TRIPPING RELAY : HIGH BURDEN TYPE AUX.VOLTAGE : 110-125V DC CONTACTS : 8NO + 2NC FLAGING : STANDARD HAND RESET CONTACT MECHANISM : HAND&ELECTRICALLY-RESET | 276 | 1 | MVAJ105 | ALSTOM | MVAJ105 RA0802A | UK |
| D | 12 | U25.5003 | 86B-1 | TRIP UNIT (86B-1) COMPRISING OF: TRIPPING RELAY : HIGH BURDEN TYPE AUX.VOLTAGE : 110-125V DC CONTACTS : 8NO + 2NC FLAGING : STANDARD HAND RESET CONTACT MECHANISM : HAND&ELECTRICALLY-RESET | 276 | 1 | MVAJ105 | ALSTOM | MVAJ105 RA0802A | UK |
| | 13 | U25.5004 | 86B-2 | TRIP UNIT (86B-2) COMPRISING OF: TRIPPING RELAY : HIGH BURDEN TYPE AUX.VOLTAGE : 110-125V DC CONTACTS : 8NO + 2NC FLAGING : STANDARD HAND RESET CONTACT MECHANISM : HAND&ELECTRICALLY-RESET | 277 | 1 | MVAJ105 | ALSTOM | MVAJ105 RA0802A | UK |
| E | | | | | | | | | | |
| F | | | | | | | | | | |

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|---|------------------------------|-------|--------------------------|--|--|--|--------------------------------------|--|---|-----------|----------------|-----------|----------|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | LIST OF APPARATUS | | <div> <div>  <div> <div>نقل الكهرباء</div> <div>الشركة الوطنية لنقل الكهرباء</div> </div> </div> <div> <div>National Grid sa</div> </div> </div> | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | - | C421 | CD-322945 | SHT | CONT. |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | | | | L02 | L03 |

NG/D2-D (2012/01)


DMS

VECTOR

NGD200

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | |
| A | SR. NO. | GA REF. | SCH. REF. | D E S C R I P T I O N | | SHT. | QTY. | TYPE | MAKE | ORDERING INFORMATION | ORGIN OF COUNTRY | | |
| | 14 | U29.101 | 74R1/74RS | DUAL TARGET RELAY REVERSE FLAG " R1 & RS DC SUPPLY FAIL" CONTACT DATA : 1NO + 2NC PER COIL | | 234 | 1 | RXSF 1 | ABB | RK 271 019-AN | SWEDEN | | |
| | 15 | U29.301 | TMR/86B-1 | DELAY FOR PICKUP RELAY AUXILIARY VOLTAGE : 24-250V DC CONTACT DATA : 2C/O | | 276 | 1 | RXKL1 | ABB | 1MRK 000 066-AB | SWEDEN | | |
| B | 16 | U29.107 | TMR/86B-2 | DELAY FOR PICKUP RELAY AUXILIARY VOLTAGE : 24-250V DC CONTACT DATA : 2C/O | | 277 | 1 | RXKL1 | ABB | 1MRK 000 066-AB | SWEDEN | | |
| | 17 | U29.113 U29.307 | R1 R2 | RESISTOR UNIT FOR TCS RESISTOR WATT : 0.5-1.0 W ,10 OHMS | | 291 292 | 2 | RXTMA1 | ABB | RK 711 008-AF | SWEDEN | | |
| C | | | | | | | | | | | | | |
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| F | | | | | | | | | | | | | |
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| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | LIST OF APPARATUS | | الشركة الوطنية لنقل الكهرباء National Grid sa | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | - | C421 | CD-322945 | L03 L04 | 01 |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTFD ENG. DEPT. AUT-FSAC | | RIYADH SAUDI ARABIA | | | | | | |
| NG/D2-D (2012/01) | | | | | | | | | | | | | |
| DMS VECTOR NGD20 | | | | | | | | | | | | | |

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|---|---------|----------|-----------|---|------|------|-----------------------|--------|--|------------------|
| A | SR. NO. | GA REF. | SCH. REF. | D E S C R I P T I O N | SHT. | QTY. | TYPE | MAKE | ORDERING INFORMATION | ORGIN OF COUNTRY |
| | 18 | | | MCB 2 POLE 6A, FOR DC SUPPLY WITH 2NC AUXILIARY CONTACT | 216 | 4 | S282 UC K6 S2-H02 | ABB | GH S282 0164 R0317 GH S270 1916 R0003 | GERMANY |
| | | U39.5001 | Q1 | R1 ± SUPPLY | | | | | | |
| | | U39.5002 | Q2 | RS± SUPPLY | | | | | | |
| | | U36.5001 | Q3 | TC1± SUPPLY | | | | | | |
| | | U36.5002 | Q4 | TC2± SUPPLY | | | | | | |
| B | | U39.5003 | C01 | CONVENIENCE OUTLET 10A, 127V AC | 211 | 2 | USM45 & USMS45 | EGRAND | 74140 & 74180 | FRANCE |
| | | | C02 | CONVENIENCE OUTLET 10A, 220V AC | | | | | | |
| | 19 | | C1,C2 | MINIATURE CIRCUIT BREAKER, 2 POLE, 10A FOR CONVENIENCE OUTLET WITH AUXILIARY SWITCH, 1NO + 1NC CONTACT | 211 | 2 | S202P-P10 S2C-H11L | ABB | 2CDS 252 001 R0427 GH S270 1917 R0001 | GERMANY |
| | 20 | | C3 | THERMOSTAT FOR SPACE HEATER, 5-60 C | 211 | 1 | SK 3110 | RITTAL | SK3110 | |
| | 21 | U39.5004 | TJ | TELEPHONE JACK 1GANG 4WIRE | 211 | 1 | EDF410 | EDISON | EDF410 | THIWAN |
| C | 22 | | C7 | ON/OFF SWITCH FOR SPACE HEATER | 211 | 1 | M2SS1-10B MCBH-10 | ABB | 1SFA 611 200 R1006 1SFA 611 605 R1101 | SWEDEN |
| | 23 | | DS | DOOR SWITCH FOR CONTROL OF CUBICLE INTERNAL ILLUMN. LAMP | 211 | 1 | LS30P | ABB | 1SBV 010213R 1202 | |
| | 24 | | IL | INTERNAL ILLUMINATION CUBICLE LAMP SUITABLE FOR 127V AC, 60Hz SUPPLY | 211 | 1 | T4 | SUNON | SP-20W | |
| D | 25 | | SH | SPACE HEATER, 150W, 120V, 60Hz | 211 | 1 | RICA | GRUPPO | 1FZEK006C001 | ITALY |
| E | | | | | | | | | | |
| F | | | | | | | | | | |

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| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | LIST OF APPARATUS | | الشركة الوطنية لنقل الكهرباء | |  نقل الكهرباء National Grid sa | | | | |
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| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | - | C421 | CD-322945 | | SHT | CONT. | 01 |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | | | | | L04 | L05 | |

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| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | | | | | | | | | | |
| B | | | | | | | | | | |
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| D | | | | | | | | | | |
| E | | | | | | | | | | |
| F | | | | | | | | | | |

| LABEL REF. | LABEL ENGRAVING | MATERIALS | ENGRAVING | LABEL SIZE | LETTER SIZE |
|------------|---------------------------|---------------------|--------------------------------------|------------|-------------|
| U05.5002 | U05.5002 51/51N/50/50N | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U10.5001 | U10.5001 27B-1A | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U10.5002 | U05.5002 27B-2A | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U05.5001 | U05.5001 TS-1 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U15.107 | U15.107 TS-2 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U15.119 | U15.119 TS-3 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U19.5001 | U19.5001 S86BC | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U19.5002 | U19.5002 S86CBF | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U19.5003 | U19.5003 S86B-1 | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U19.5004 | U19.5004 S86B-2 | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U19.5005 | U19.5005 SS50 | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U25.5001 | U25.5001 86BU | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U25.5002 | U25.5002 86CBF | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U25.5003 | U25.5003 86B-1 | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U25.5004 | U25.5004 86B-2 | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| U29.101 | U29.101 74R1/74RS | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U29.301 | U29.301 TMR/86B-1 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U29.107 | U29.107 TMR/86B-2 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U29.307 | U29.307 R2 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |
| U29.113 | U29.113 R1 | ALUMINUM PAPER FOIL | BLACK LETTERS | 50X10mm | 3mm |

| | | | | | | | | | | | | | | | | | | |
|------------------------------|--|--|--------------------------|--|-----------------------|--|--------------------------------------|--|---|--|-----------|--|----------------|--|-----------|--|----------|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | LIST OF APPARATUS | | <div>الشركة الوطنية لنقل الكهرباء</div> <div>نقل الكهرباء</div> <div>National Grid sa</div> | | | | | | | | | |
| 01 13 49 | | | DRAWN BY RIZ | | CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | | PLANT NO. | | DRAWING NUMBER | | SHEET NO. | | REV. NO. | |
| 00 13 04 | | | DATE STARTED 24.01.2013 | | DATE COMPLETED | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | - | | C421 | | CD-322945 | | SHT | | CONT. | |
| REV. NO. DATE DESCRIPTION | | | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | | | | | | | L06 | | L07 | |
| | | | | | | | | | | | | | | | | | 01 | |


NG/D2-D (2012/01)


DMS VECTOR


NGD200

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| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| B | | | | | | | | | | |
| C | | | | | | | | | | |
| D | | | | | | | | | | |
| E | | | | | | | | | | |
| F | | | | | | | | | | |

| LABEL REF. | LABEL ENGRAVING | MATERIALS | ENGRAVING | LABEL SIZE | LETTER SIZE |
|------------|--------------------------|-----------|--------------------------------------|------------|-------------|
| C1 | C1 127V AC SUPPLY MCB | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| C2 | C2 220V AC SUPPLY MCB | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| C3 | C3 THERMOSTAT | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| C7 | C7 ON/OFF SWITCH | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| DS | DS DOOR SWITCH | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| IL | IL ILLUMINATION LAMP | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |
| SH | SH SPACE HEATER | TRAFOLITE | BLACK LETTERS ON WHITE BACKGROUND | 50X15mm | 4mm |


| | | | | | | | | | | | | | | | |
|------------------------------|----------|-------|--------------------------|--|--|--|--------------------------------------|--|------------------------------|-----------|--|--|-----------|-------|----------|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | LIST OF APPARATUS | | الشركة الوطنية لنقل الكهرباء | |  نقل الكهرباء National Grid sa | | | | |
| G | 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | | SHT | CONT. | |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTFD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | - | C421 | CD-322945 | | L07 | --- | 01 |
| | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A |  | | POWER SYSTEMS NETWORK MANAGEMENT PROTECTION AND SUBSTATION AUTOMATION SYSTEMS WBS NO: S-13656 | | | | | ABB AUTOMATION COMPANY LTD. 414, AL-KHARJ ROAD SECOND INDUSTRIAL CITY RIYADH-11383 K.S.A | | |
| B | | | | | | | | | | |
| C | | | | | | | | | | |
| D | CONTRACTOR : ABB Contracting Company | | | | | | | | | |
| | CLIENT : National Gridsa | | | | | | | | | |
| | PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY | | | | | | | | | |
| | SUBSTATION : S/S 8709 | | | | | | | | | |
| E | CONTRACT NO. : 11131113/00 | | | | | | | | | |
| F | TITLE : Schematic Drawing +R130 [BUS COUPLER-A] | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|------------------------------|-------|--------------------------|-------------------------|---------------------|--------------------------------------|---|-----------|----------------|-----------|-------------------|--------|--------|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656 | COVER SHEET | |  نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa | | | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR | 132kV BUS COUPLER ZONE 1A/2A +R130 | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. | | |
| | 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED | S/S 8709-132/13.8KV IN AL-KHARJ CITY | - | C421 | CD-322946 | SHT 000 | CONT. 001 | | |
| | REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC | RIYADH SAUDI ARABIA | | | | | 01 | | |
| | | | | | | | | | | | NG/D2-D (2012/01) | | |
| | | | | | | | | | | | DMS | VECTOR | NGD200 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| A | | | | | | | | | | |
| B | | | | | | | | | | |
| C | | | | | | | | | | |
| D | | | | | | | | | | |
| E | | | | | | | | | | |
| F | | | | | | | | | | |

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|--------|--|--------|---|--------|--|
| | FUSE / LINK | | WATTMETER | | ELEMENT WITH NEGATED INHIBITING INPUT |
| | FUSE WITH THE SUPPLY SIDE INDICATED | | VARMETER | | ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION |
| | SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS) | | POWER FACTOR METER | | ELEMENT WITH POSTPONED OUTPUT |
| | SINGLE-PHASE TRANSFORMER WITH THREE SEPARATE WINDINGS (TWO ALTERNATIVE FORMS) | | POSITION INDICATOR | | AND-ELEMENT WITH TWO INPUTS |
| | SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC GORE | | SYNCHROSCOPE | | OR-ELEMENT WITH TWO INPUTS |
| | SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION) | | RECORDING VOLTMETER | | LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2 |
| | SINGLE-PHASE VOLTAGE TRANSFORMER WITH TWO SECONDARY WINDINGS (MULTI-LINE AND SINGLE-LINE REPRESENTATION) | | RECORDING WATTMETER | | ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2" |
| | CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION) | | HOUR METER | | EXCLUSIVE OR-ELEMENT WITH THREE INPUTS |
| | CURRENT TRANSFORMER WITH TWO CORES (MULTI-LINE AND SINGLE-LINE REPRESENTATION) | | WATT-HOUR METER | | LOGIC IDENTITY ELEMENT WITH THREE INPUTS |
| | CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE GORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION) | | WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM | | MAJORITY ELEMENT WITH THREE INPUTS |
| | FILTER | | ELEMENT WITH STATIC INPUT | | NEGATOR |
| | HIGH-PASS FILTER | | ELEMENT WITH STATIC NEGATED INPUT | | NAND ELEMENT WITH TWO INPUTS |
| | BAND-PASS FILTER | | ELEMENT WITH STATIC NEGATED OUTPUT | | NOR ELEMENT WITH TWO INPUTS |
| | VOLTMETER | | ELEMENT WITH DYNAMIC INPUT | | BISTABLE ELEMENT |
| | AMMETER | | ELEMENT WITH DYNAMIC NEGATED INPUT | | |
| | | | ELEMENT WITH INHIBITING INPUT | | |

| | | | | | | | | | | | | |
|------------------------------|-------|--------------------------|--|---|--|---|-----------|----------------|--|-----------|-------|----------|
| AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | <div>نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa</div>  | | | | | | |
| | | | | | | | | | | | | |
| 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY <u>RIZ</u> CHECKED BY <u>JKR</u> | | GRAPHICAL SYMBOLS FOR DIAGRAMS 132kV BUS COUPLER ZONE 1A/2A +R130 S/S 8709-132/13.8KV IN AL-KHARJ CITY RIYADH SAUDI ARABIA | | | | | | |
| 00 | 13 04 | FOR APPROVAL | | DATE STARTED <u>24.01.2013</u> DATE COMPLETED _____ | | | | | | | | |
| REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. <u>CTPD</u> ENG. DEPT. <u>AUT-PSAC</u> | | | | | | | | |
| | | | | | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. |
| | | | | | | - | C421 | CD-322946 | | SHT | CONT. | 01 |
| | | | | | | | | | | 012 | 013 | |

A

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C

D

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F

G

LEGENDS

| | |
|--------------|--|
| ±R1 | DC SUPPLY – MAIN PROTECTION |
| ±R2 | DC SUPPLY – SECONDARY PROTECTION |
| ±R3 | DC SUPPLY – BACK UP PROTECTION |
| ±IT | DC SUPPLY – INTER TRIP |
| FL | DC SUPPLY – FLASHING CIRCUIT |
| BB RS± | DC SUPPLY – BUS BAR – PROTECTION RESET |
| BB CBF±/CBF± | DC SUPPLY – CBF PROTECTION |
| R | RESET BUS – ALARM SYSTEM |
| CR | CONTROL ROOM |
| ECC | ENERGY CONTROL CENTRE |
| LOCAL | THE LOCATION OF CONTROLLED DEVICE |
| REMOTE | ANY OTHER LOCATION NOT LOCAL |
| ON | CB NORMALLY OPEN AUXILIARY CONTACT |
| OFF | CB NORMALLY CLOSED AUXILIARY CONTACT |
| A | COMMON |
| T | TEST POSITION |
| S | SERVICE POSITION |
| CS | CLOSE IN SERVICE POSITION |
| CT | CLOSE IN TEST POSITION |
| LS | LOCAL SERVICE |
| LT | LOCAL TEST |
| LC | LOCAL CLOSE |
| LO | LOCAL OPEN |
| RO | REMOTE OPEN |

NOTES

LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

WIRING

PVC INSULATED 600V GRADE
2.5 SQ.mm. YELLOW COLOURED FOR CT CIRCUITS
2.5 SQ.mm. RE COLOURED FOR VT CIRCUITS
1.5 SQ.mm. GREY COLOURED FOR DC SUPPLY, SCADA AND CONTROL CIRCUITS
1.5 SQ.mm. BLUE COLOURED FOR COMMON ALARM SIGNALS
2.5 SQ.mm. BLACK COLOURED FOR AVC AND AC CIRCUITS
2.5 SQ.mm. YELLOW/GREEN COLOURED FOR EARTHING CONNECTIONS
FOLLOWING MARKERS SHALL BE PROVIDED ON FOLLOWING WIRES:
+ SIGN FOR DC + WIRE
– SIGN FOR DC – WIRE

LUGS

A. CT CIRCUITS– RING TYPE
B. OTHER CIRCUITS – SPADE TYPE

FERULLING

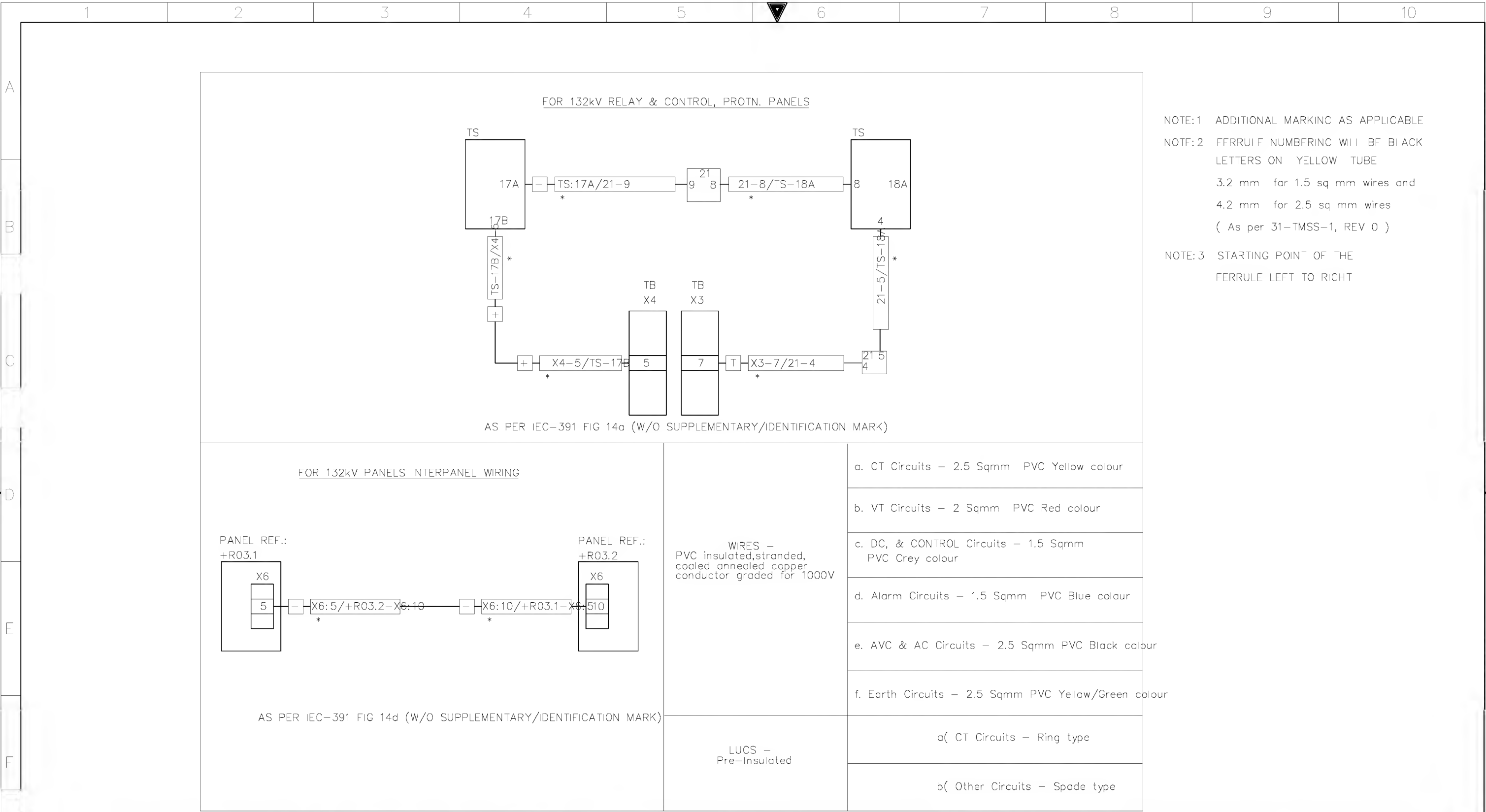
YELLO TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES (AS PER 31 – TMSS–1, RE.0)

AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | | | |
|----------|-------|-----------------|-------------------------|----------------------|
| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED _____ |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

| | |
|--------------------------------------|--|
| COMMON LEGENDS | |
| 132kV BUS COUPLER ZONE 1A/2A +R130 | |
| S/S 8709-132/13.8KV IN AL-KHARJ CITY | |
| RIYADH SAUDI ARABIA | |

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| الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | |
| National Grid sa | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. |
| - | C421 | CD-322946 | SHT CONT. |
| | | 013 014 01 | |



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B

C

D

E

F

| MANUFACTURER | SCHEMATICS DWG.NO | PANEL DESCRIPTION | PANEL REFERENCE |
|--------------|-------------------|---|-----------------|
| | | SS 8709 132kV RELAY PANELS | |
| CD-322928 | | 132/13.8kV GT-1 RELAY PANEL -1 | +R05.1 |
| | | 132/13.8kV GT-1 RELAY PANEL -2 | +R05.2 |
| CD-322931 | | 132/13.8kV GT-2 RELAY PANEL -1 | +R01.1 |
| | | 132/13.8kV GT-2 RELAY PANEL -2 | +R01.2 |
| CD-322934 | | 132/13.8kV GT-3 RELAY PANEL -1 | +R04.1 |
| | | 132/13.8kV GT-3 RELAY PANEL -2 | +R04.2 |
| CD-322936 | | 132/13.8kV TRANSFORMER-1,2& 3 AVC PANEL | +AVC |
| CD-322922 | | 132KV SPARE-1 UGF RELAY PANEL -1 | +R07.1 |
| | | 132KV SPARE-1 UGF RELAY PANEL -2 | +R07.2 |
| CD-322916 | | 132KV 8020 UGF RELAY PANEL -1 | +R02.1 |
| | | 132KV 8020 UGF RELAY PANEL -2 | +R02.2 |
| CD-322919 | | 132KV 8710 UGF RELAY PANEL -1 | +R03.1 |
| | | 132KV 8710 UGF RELAY PANEL -2 | +R03.2 |
| CD-322925 | | 132KV SPARE-2 UGF RELAY PANEL -1 | +R06.1 |
| | | 132KV SPARE-2 UGF RELAY PANEL -2 | +R06.2 |
| CD-323012 | | 132KV FOIP PANEL | +FOIP |
| CD-322946 | | 132kV BUS COUPLER-A | +R130 |
| CD-322948 | | 132kV BUS COUPLER-B | +R230 |
| CD-322950 | | 132kV BUS SECTION | +R120 |
| CD-322991 | | 132kV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL | +BB1-1 |
| CD-322993 | | 132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL | +BB1-2 |
| CD-322995 | | 132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL | +BB1-3 |
| CD-322997 | | 132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL | +BB1-4 |
| CD-322999 | | 132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL | +BB1-5 |
| CD-323001 | | 132kV BUSBAR PROTECTION MAIN-2 CENTRAL UNIT PANEL | +BB2-1 |
| CD-323003 | | 132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL | +BB2-2 |
| CD-323005 | | 132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL | +BB2-3 |
| CD-323007 | | 132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL | +BB2-4 |
| CD-323009 | | 132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL | +BB2-5 |



PROTECTION & SUBSTATION
AUTOMATION

AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | |
|----------|-------|-----------------|
| 01 | 13 49 | FACTORY ASBUILT |
| 00 | 13 04 | FOR APPROVAL |
| REV. NO. | DATE | DESCRIPTION |

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

DRAWING REFERENCES

132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | | REV. NO. |
|-------|-----------|----------------|-----------|-------|----------|
| | | | SHT | CONT. | |
| - | C421 | CD-322946 | 015 | 016 | 01 |

NG/D2-D (2012/01)


DMS


VECTOR

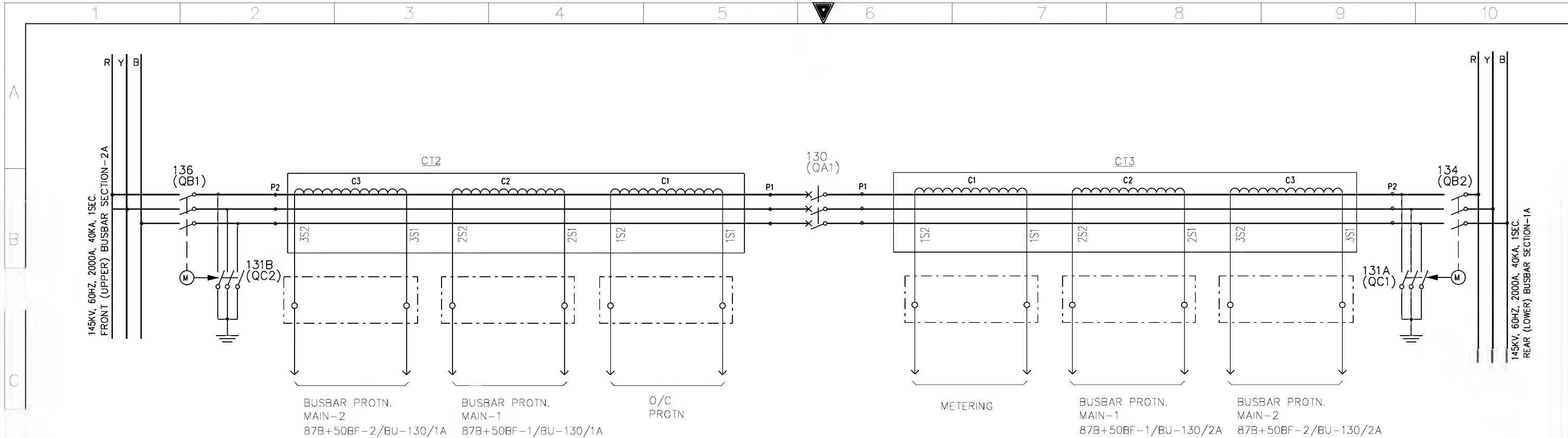
NGD200

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| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| F | | | | | | | | | | |

| MANUFACTURER | SCHEMATICS DWG.NO | PANEL DESCRIPTION | PANEL REFERENCE |
|--|-------------------|--|-----------------|
|  PROTECTION & SUBSTATION AUTOMATION | | SS 8709 13.8KV RELAY PANELS | |
| | CD-322952 | 13.8KV Capacitor Bank-1 Protection Panel | +CBP-1 |
| | CD-322954 | 13.8KV Capacitor Bank-2 Protection Panel | +CBP-2 |
| | CD-322956 | 13.8KV Capacitor Bank-2 Protection Panel | +CBP-3 |
| | CD-322958 | 13.8 KV ACCS PANEL | +ACCS |
| | CD-322962 | 13.8KV ACSE PANEL | +ACSE |
| | CD-322968 | 13.8KV Under Voltage Load Shedding Panel | +UVLS |
| | CD-322964 | 13.8KV Under Frequency Load Shedding Panel-1 | +UFLS01 |
| | CD-322966 | 13.8KV Under Frequency Load Shedding Panel-2 | +UFLS02 |
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|---|------------------------------|-------|--------------------------|--|--|--|--------------------------------------|--|--|-----------|----------------|-----------|-------|----------|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | DRAWING REFERENCES | | <div><div>نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid SA</div></div> | | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY <u> RIZ </u> CHECKED BY <u> JKR </u> | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED <u>24.01.2013</u> DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | SHT | CONT. | |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. <u> CTPD </u> ENG. DEPT. <u> AUT-PSAC </u> | | RIYADH SAUDI ARABIA | | | | | 016 | 051 | |
| | | | | | | | | | - | C421 | CD-322946 | | | 01 |



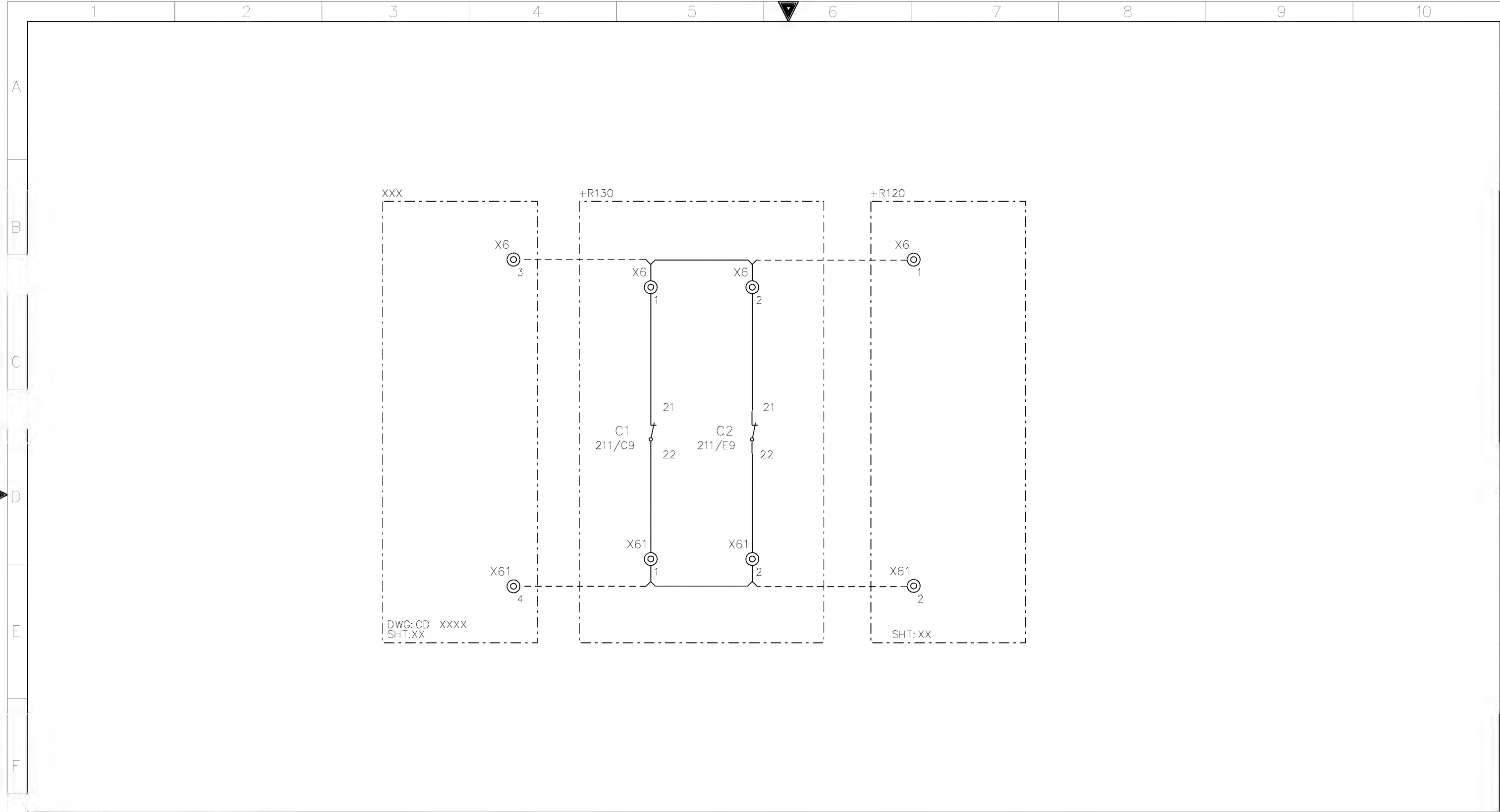
| LOCATON OF GIS CT | CT | RATIO | CLASS | VK IN VOLT | Image IN mA @ VK | RCT IN OHMS | BURDEN IN VA | BURDEN IN VA |
|-------------------|------------|---------|---------|---------------------|------------------|-------------|--------------|------------------------------|
| BUS 1A | CT3 CORE-1 | 2000/1A | 0.2Fs10 | -- | -- | -- | 30 | CONTROL IED (BCU) + METERING |
| | CT3 CORE-2 | 2000/1A | X | >600 at 2000/1A TAP | < = 25 | <5 | -- | 87B+50BF-1/BU-130/2A MAIN-1 |
| | CT3 CORE-3 | 2000/1A | X | >600 at 2000/1A TAP | < = 25 | <5 | -- | 87B+50BF-2/BU-130/2A MAIN-2 |
| BUS 2A | CT2 CORE-1 | 2000/1A | X | >600 at 2000/1A TAP | < = 25 | <5 | -- | 50/51+50/51N |
| | CT2 CORE-2 | 2000/1A | X | >600 at 2000/1A TAP | < = 25 | <5 | -- | 87B+50BF-1/BU-130/1A MAIN-1 |
| | CT2 CORE-3 | 2000/1A | X | >600 at 2000/1A TAP | < = 25 | <5 | -- | 87B+50BF-2/BU-130/1A MAIN-2 |

AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | | | |
|----------|-------|-----------------|-------------------------|---------------------|
| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

PRIMARY SYSTEM
132kv BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | | | |
|------------------------------|-----------|---|-----------|------------------|----------|
| الشركة الوطنية لنقل الكهرباء | |  | | نقل الكهرباء | |
| | | | | National Grid sa | |
| K | PLANT NO. | DRAWING NUMBER | SHEET NO. | | REV. NO. |
| | C421 | CD-322946 | SHT | CONT. | 01 |
| | | | 051 | 211 | |



AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

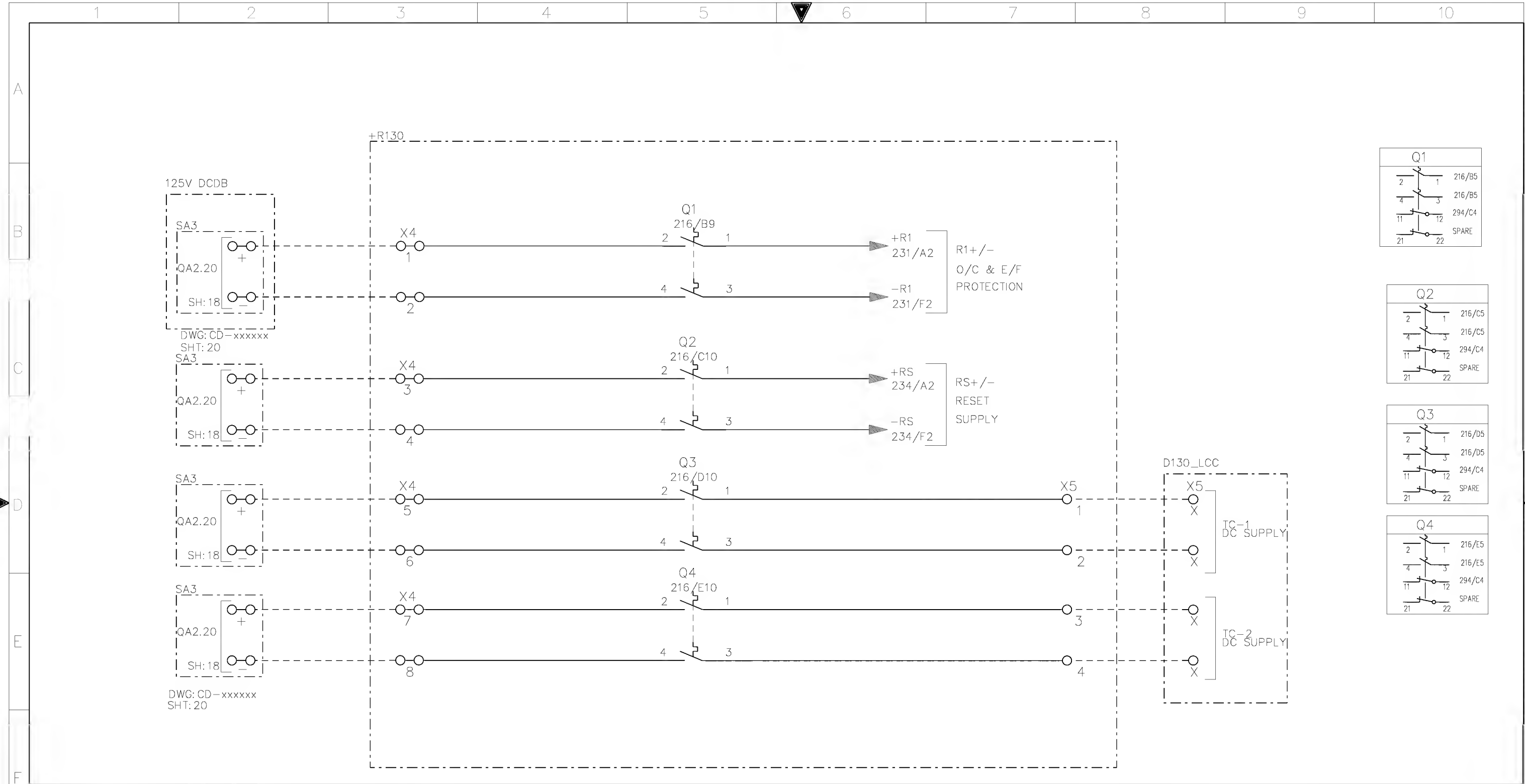
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| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 DATE COMPLETED _____ |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC |

SUPPLY AUXILARY CONTACTS
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

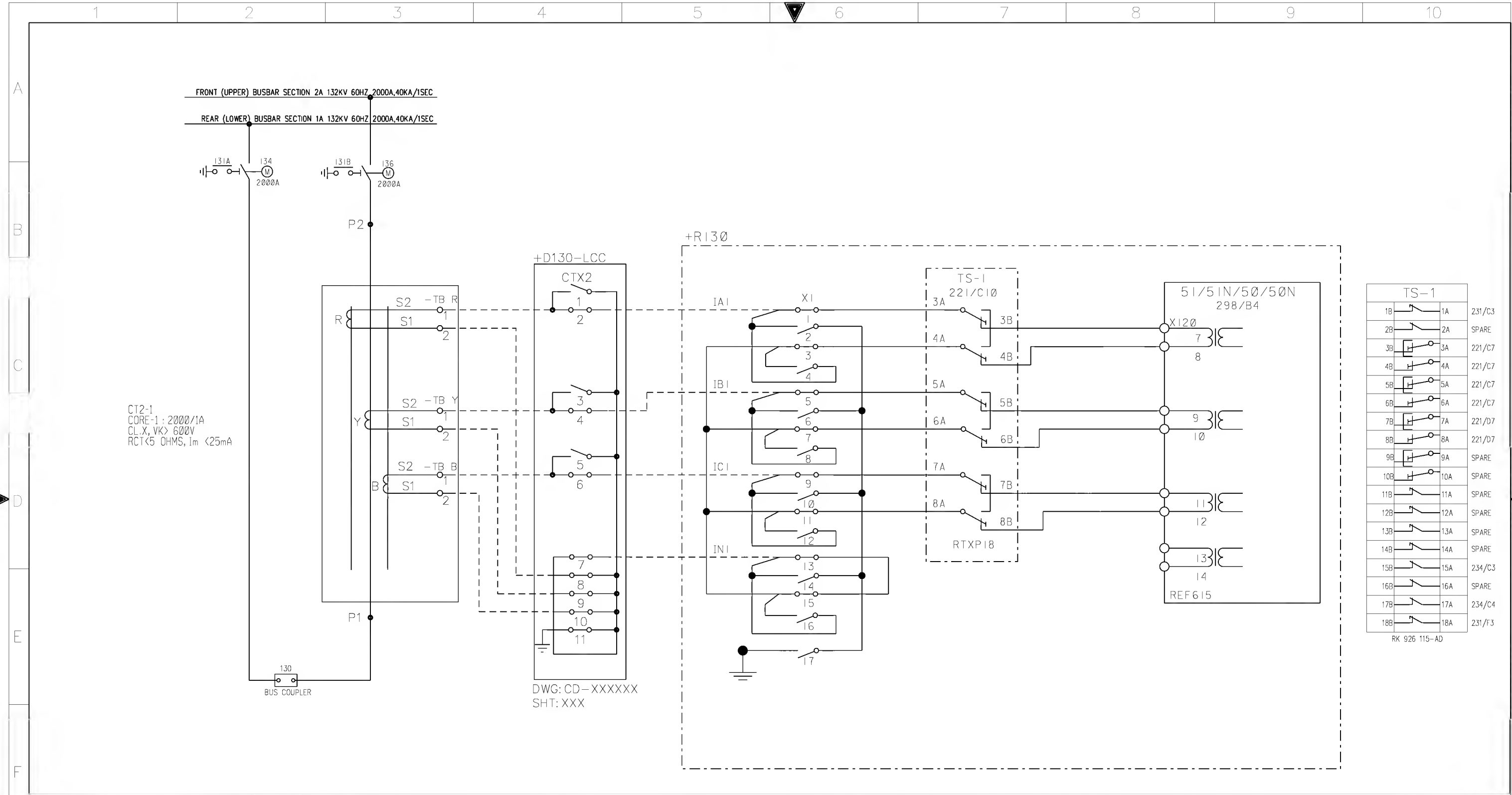
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| الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | |
| - | C421 | CD-322946 | | SHT | CONT. |
| | | | | 212 | 216 |
| | | | | REV. NO. | |
| | | | | 01 | |

NG/D2-D (2012/01)

DMS VECTOR NGD200



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|------------------------------|--|--|--------------------------|--|-----------------------|--|--------------------------------------|--|------------------------------|-----------|----------------|-----------|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | DC SUPPLY DISTRIBUTION | | الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | |
| 01 13 49 | | | DRAWN BY RIZ | | CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | National Grid sa | | | |
| 00 13 04 | | | DATE STARTED 24.01.2013 | | DATE COMPLETED | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. |
| REV. NO. DATE DESCRIPTION | | | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | - | C421 | CD-322946 | 216 |
| FOR APPROVAL | | | | | | | | | | | CONT. 221 | |
| | | | | | | | | | | | REV. NO. 01 | |



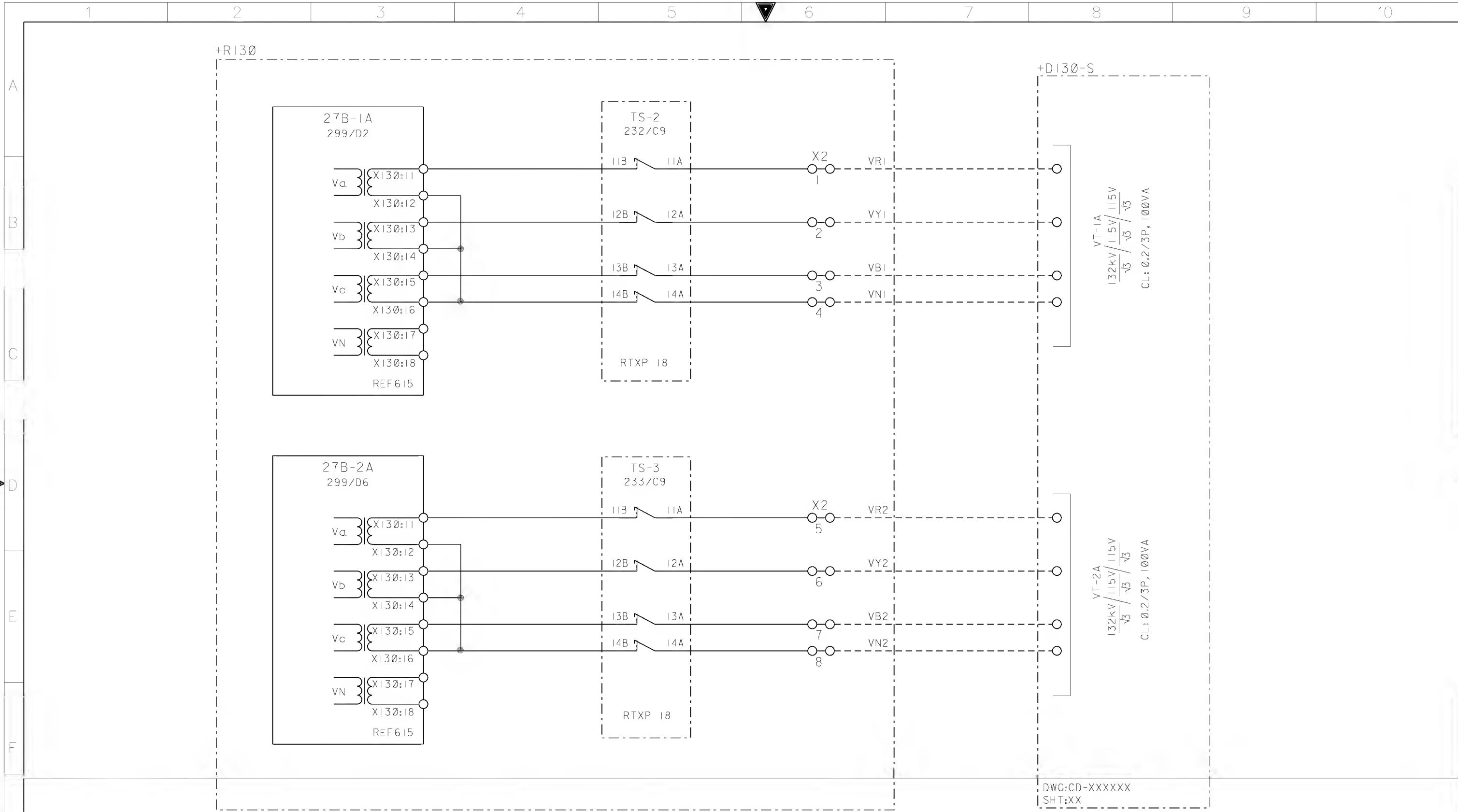
AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

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|----------|-------|-----------------|-------------------------|---------------------|
| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

CT CIRCUITS - 51/51N/50/50N RELAY
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
National Grid sa

| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
|-------|-----------|----------------|-----------|-----------|
| - | C421 | CD-322946 | SHT 221 | CONT. 222 |
| | | | | 01 |



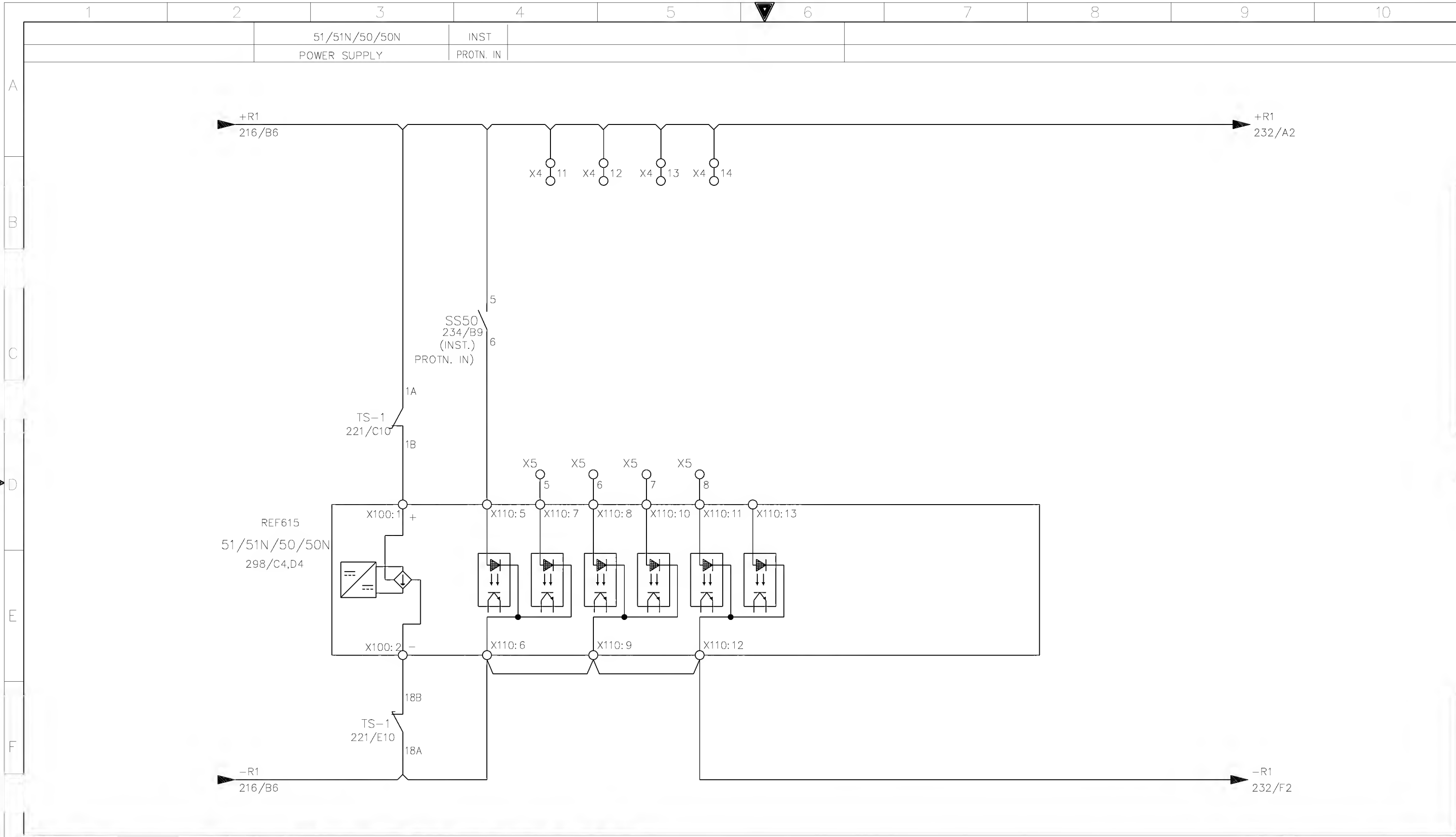
AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | |
|----------|-------|-----------------|
| 01 | 13 49 | FACTORY ASBUILT |
| 00 | 13 04 | FOR APPROVAL |
| REV. NO. | DATE | DESCRIPTION |

| | | | |
|--------------|------------|----------------|----------|
| DRAWN BY | RIZ | CHECKED BY | JKR |
| DATE STARTED | 24.01.2013 | DATE COMPLETED | |
| OPRG. DEPT. | CTPD | ENG. DEPT. | AUT-PSAC |

VT CIRCUITS BUS-1A & 2A UNDER VOLTAGE CIRCUIT
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | |
|------------------------------|-----------|------------------|-----------|
| الشركة الوطنية لنقل الكهرباء | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. |
| - | C421 | CD-322946 | 222 |
| | | | 231 |
| | | | 01 |



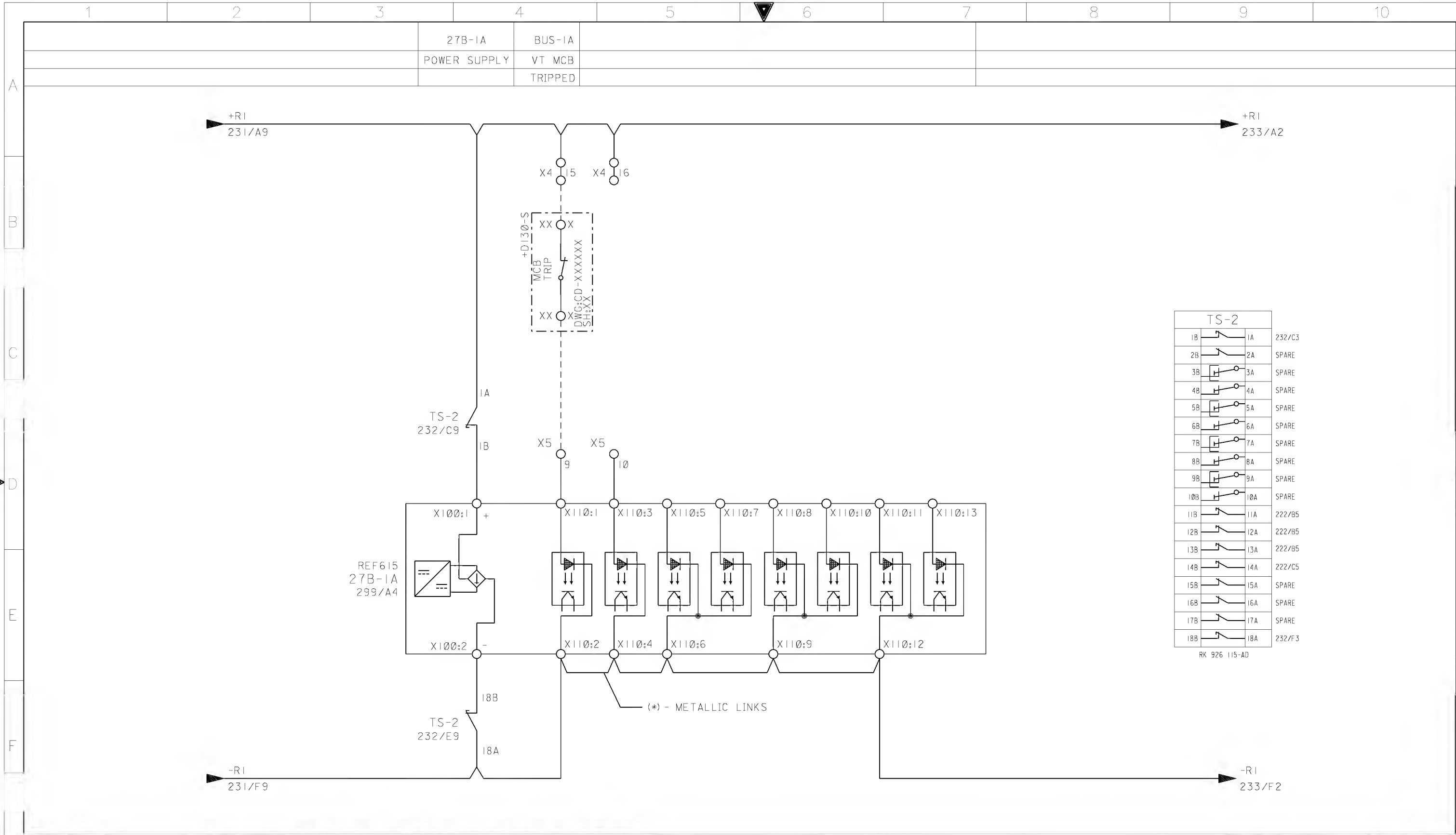
AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

| | | |
|----------|-------|-----------------|
| 01 | 13 49 | FACTORY ASBUILT |
| 00 | 13 04 | FOR APPROVAL |
| REV. NO. | DATE | DESCRIPTION |

| | | | |
|--------------|------------|----------------|----------|
| DRAWN BY | RIZ | CHECKED BY | JKR |
| DATE STARTED | 24.01.2013 | DATE COMPLETED | |
| OPRG. DEPT. | CTPD | ENG. DEPT. | AUT-PSAC |

51/51N/50/50N BINARY INPUTS
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | | | |
|------------------------------|-----------|----------------|--|------------------|-------|
| الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | |
| - | C421 | CD-322946 | | SHT | CONT. |
| | | | | 231 | 232 |
| | | | | REV. NO. | |
| | | | | 01 | |



AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

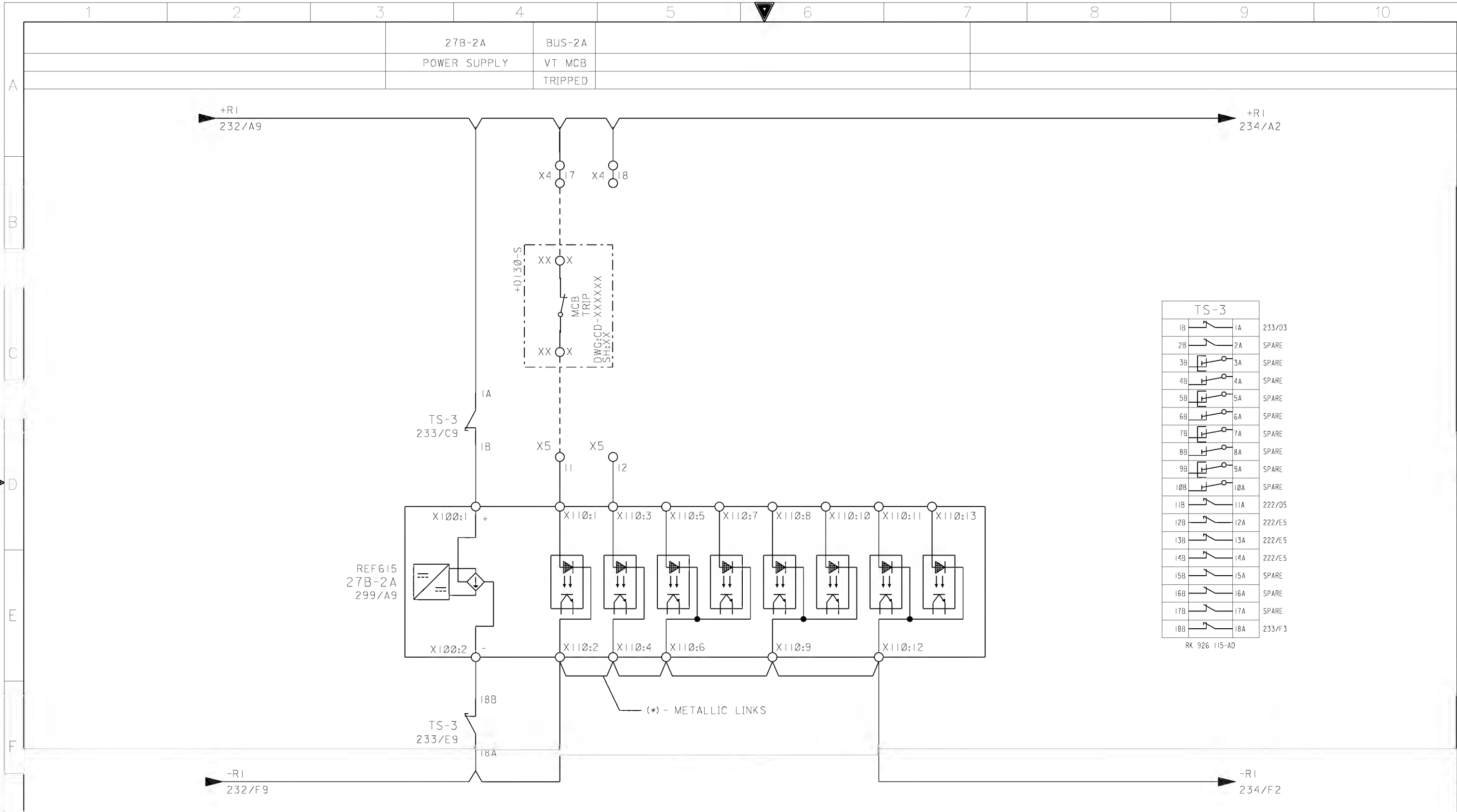
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| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

27B-1A BINARY INPUTS
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | | | |
|------------------------------|-----------|----------------|-----------|------------------|----|
| الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. | |
| - | C421 | CD-322946 | SHT 232 | CONT. 233 | 01 |

NG/D2-D (2012/01)

DMS VECTOR NGD200

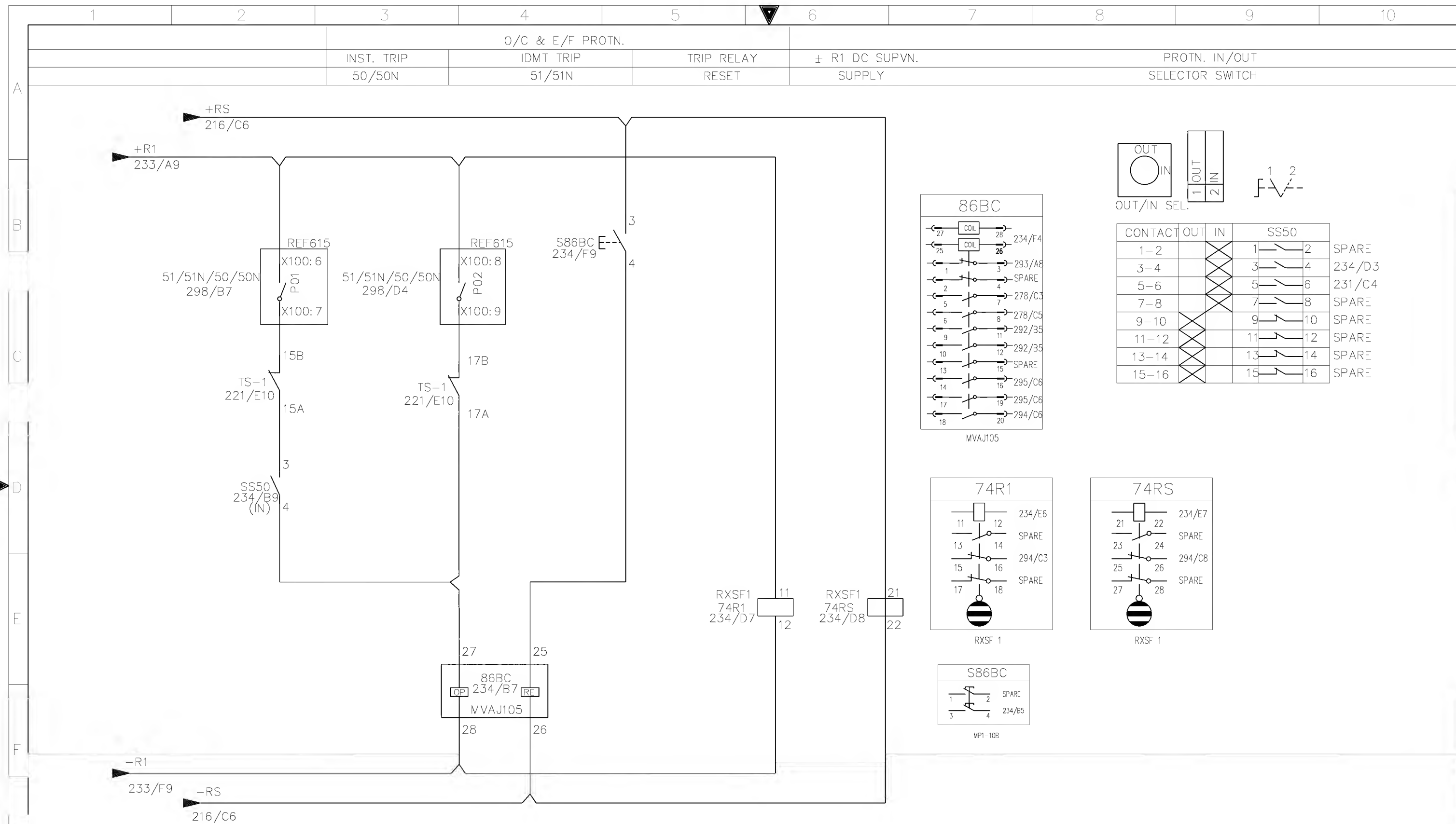


AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

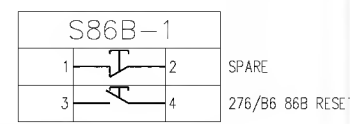
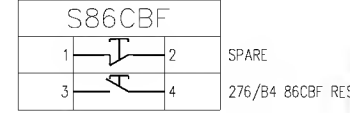
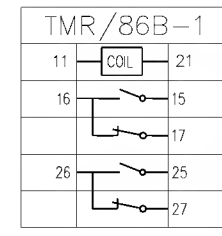
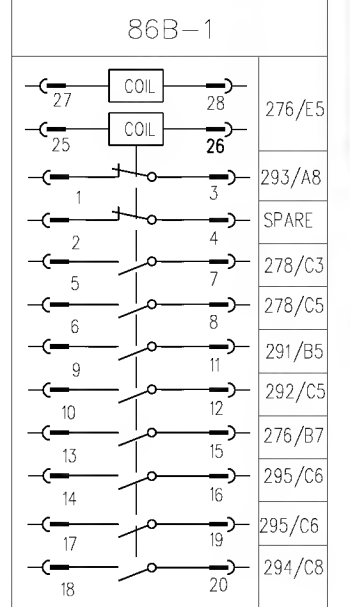
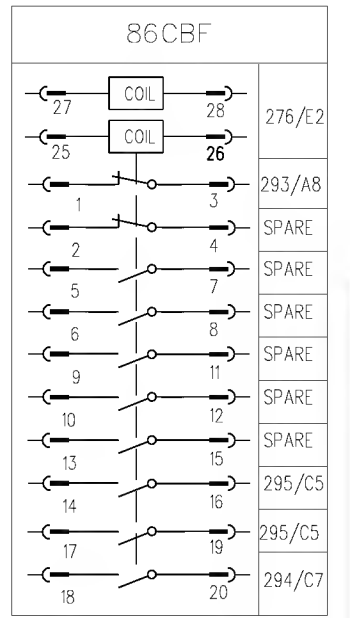
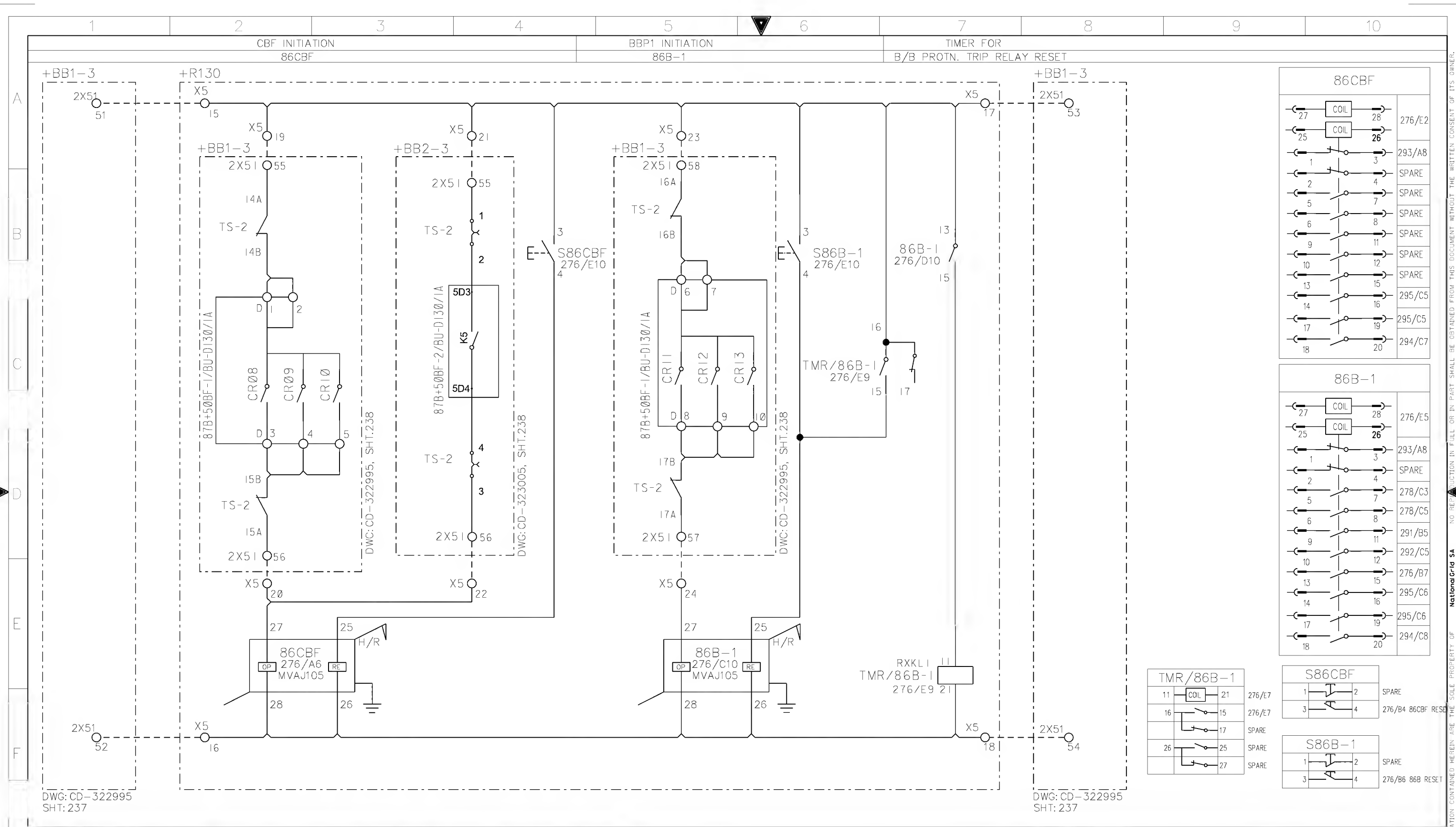
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| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

27B-2A BINARY INPUTS
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | | | |
|------------------------------|-----------|----------------|-----------|------------------|----|
| الشركة الوطنية لنقل الكهرباء | | نقل الكهرباء | | National Grid sa | |
| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. | |
| - | C421 | CD-322946 | SHT 233 | CONT. 234 | 01 |

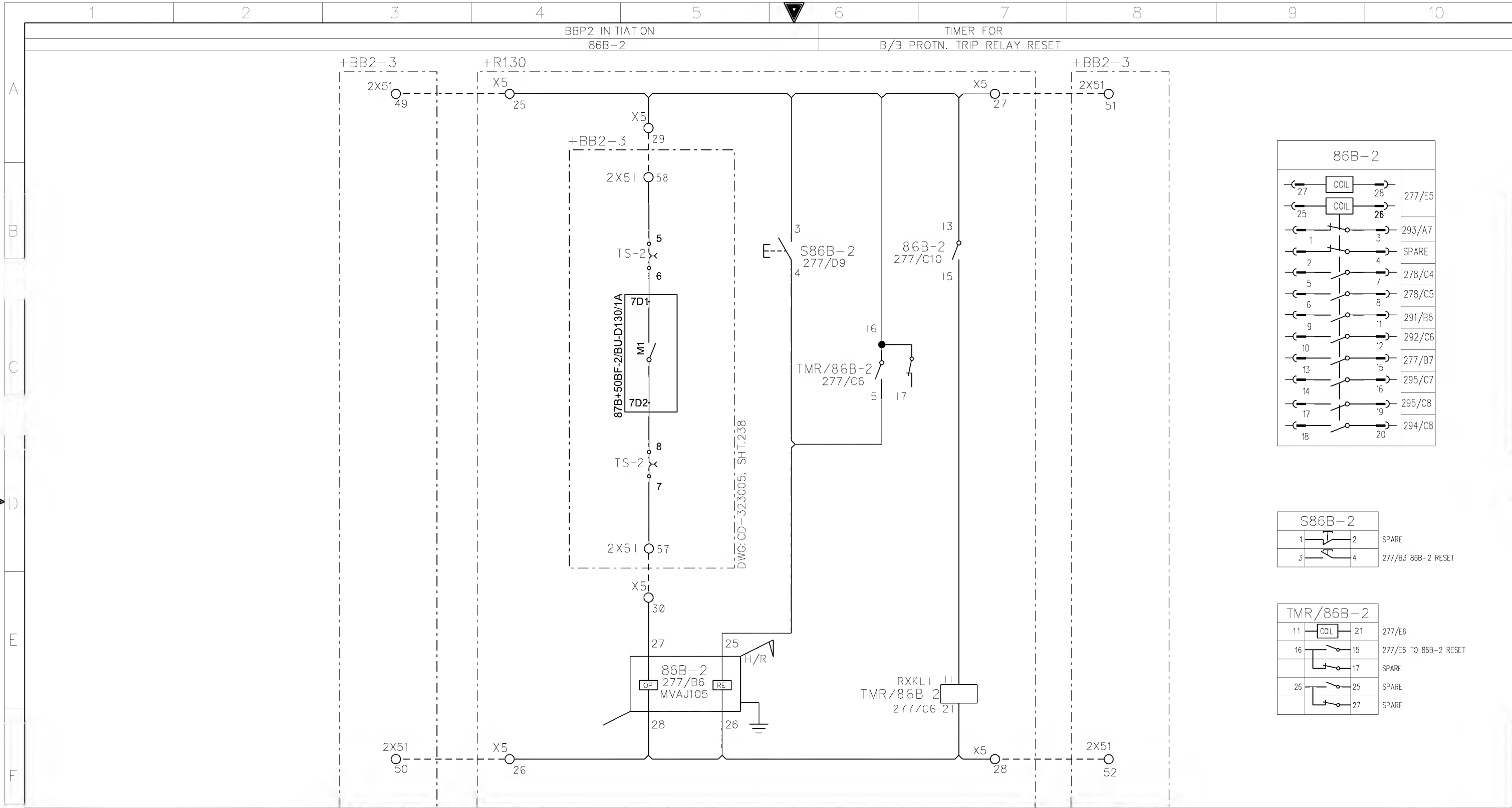


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|------------------------------|--|-------|--------------------------|-------------|--|--------------------------------------|---|---------------------|---|---|-----------|------|----------------|-----------|-----------|-------------------|----------|----|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | B/U O/C & E/F PROTN. TRIP RELAY CIRCUIT | | <div>الشركة الوطنية لنقل الكهرباء</div> <div>National Grid sa</div> | | | | | | | | | | |
| 01 | | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | | | | | | | | | | |
| 00 | | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | INDEX | | PLANT NO. | | DRAWING NUMBER | | SHEET NO. | | REV. NO. | | |
| REV. NO. | | DATE | | DESCRIPTION | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | - | | C421 | | CD-322946 | | SHT 234 CONT. 276 | | 01 | |



| | | | | | | | | | |
|------------------------------|--|--|--|--|--|---|--|---|--|
| AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | CBF-1/2 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT | | الشركة الوطنية لنقل الكهرباء National Grid sa | |
| 01 13 49 FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | |
| 00 13 04 FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO. | |
| REV. NO. DATE DESCRIPTION | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | - C421 CD-322946 | | 276 277 01 | |

NG/D2-D (2012/01)
DMS VECTOR NGD200

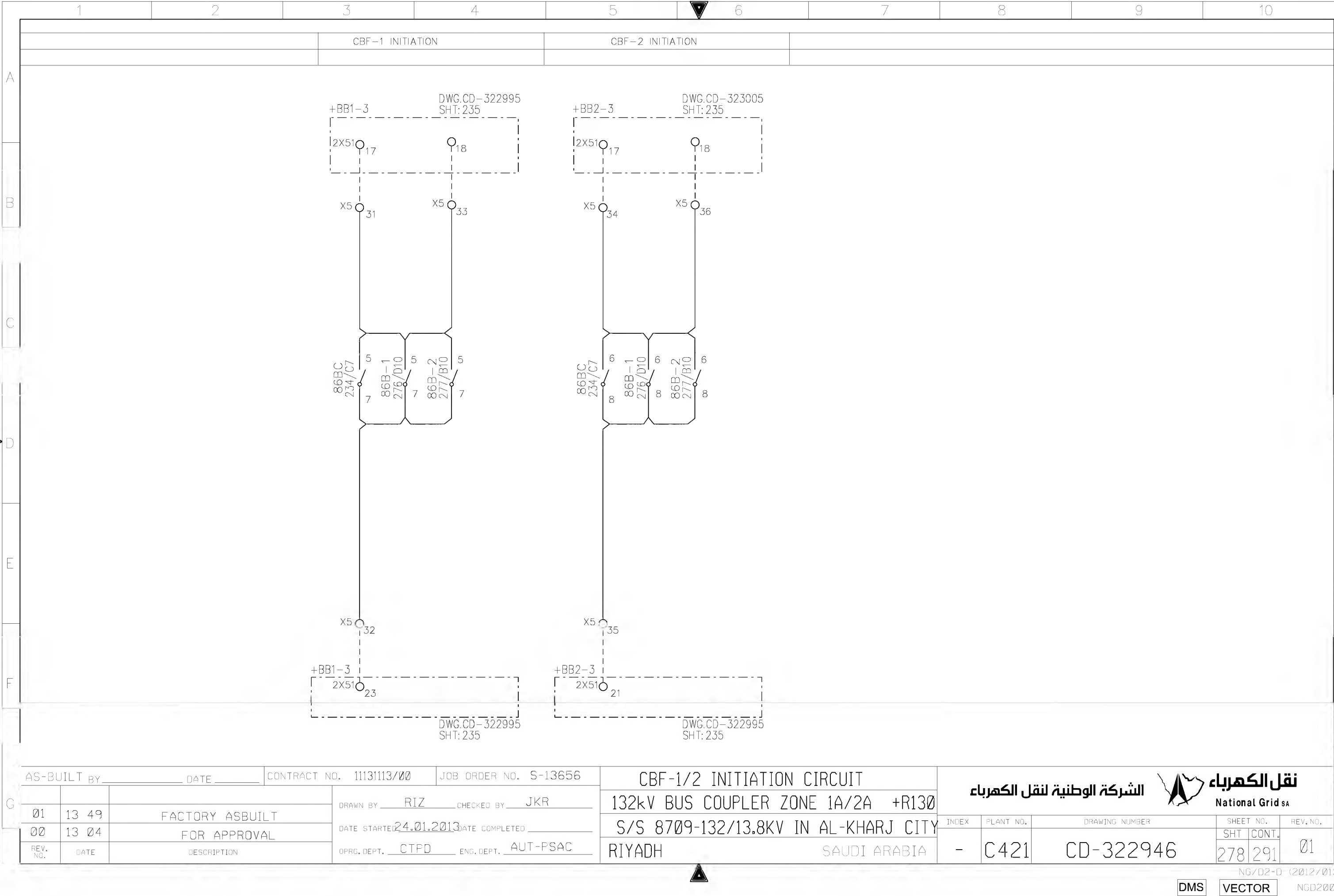


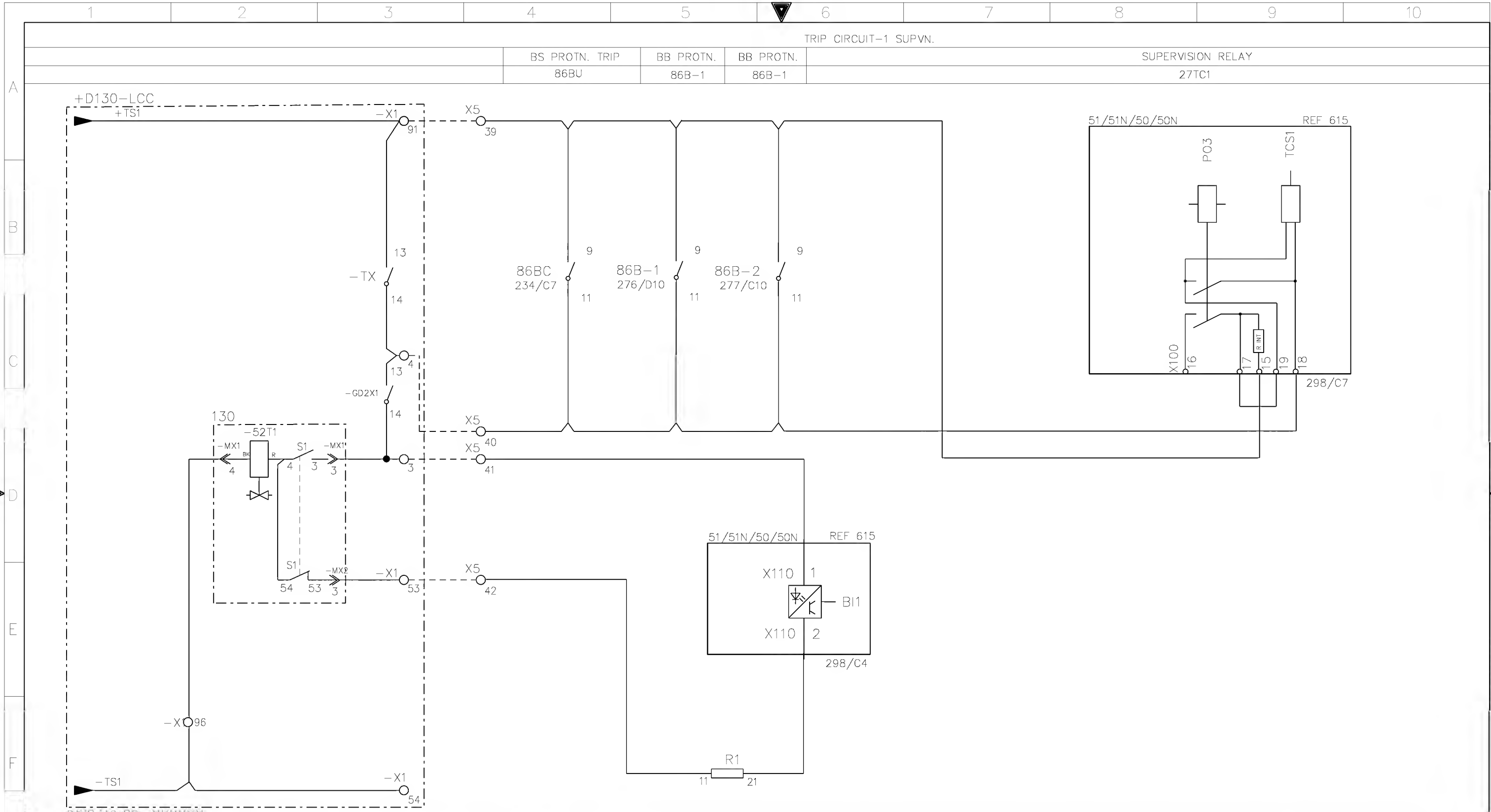
| 86B-2 | | | |
|-------|------|----|--------|
| 27 | COIL | 28 | 277/E5 |
| 25 | COIL | 26 | |
| 1 | | 3 | 293/A7 |
| 2 | | 4 | SPARE |
| 5 | | 7 | 278/C4 |
| 6 | | 8 | 278/C5 |
| 9 | | 11 | 291/B6 |
| 10 | | 12 | 292/C6 |
| 13 | | 15 | 277/B7 |
| 14 | | 16 | 295/C7 |
| 17 | | 19 | 295/C8 |
| 18 | | 20 | 294/C8 |

| S86B-2 | | | |
|--------|--|---|--------------------|
| 1 | | 2 | SPARE |
| 3 | | 4 | 277/B3 86B-2 RESET |

| TMR/86B-2 | | | |
|-----------|------|----|-----------------------|
| 11 | COIL | 21 | 277/E6 |
| 16 | | 15 | 277/E6 TO 86B-2 RESET |
| | | 17 | SPARE |
| 26 | | 25 | SPARE |
| | | 27 | SPARE |

| | | | | | | | | | | | | | | | | |
|---|------------------------------|-------|--------------------------|-------------------------|-----------------------|----------------------|------------------------------------|--------------------------------------|---|-----------|----------------|--|-----------|-----------|----------|--|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | BUSBAR PROTN-2 TRIP RELAY CIRCUIT | | <div>الشركة الوطنية لنقل الكهرباء</div> <div>National Grid sa</div> | | | | | | | |
| | | | | | | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | | | | | | | |
| | Ø1 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | | CHECKED BY JKR | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | | | | |
| | Ø0 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | | DATE COMPLETED _____ | | RIYADH SAUDI ARABIA | | | | | | | | |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTFD | | ENG. DEPT. AUT-PSAC | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. | |
| | | | | | | | | | - | C421 | CD-322946 | | SHT 277 | CONT. 278 | Ø1 | |





DWG.NO.CD-XXXXXX
SHT.XX

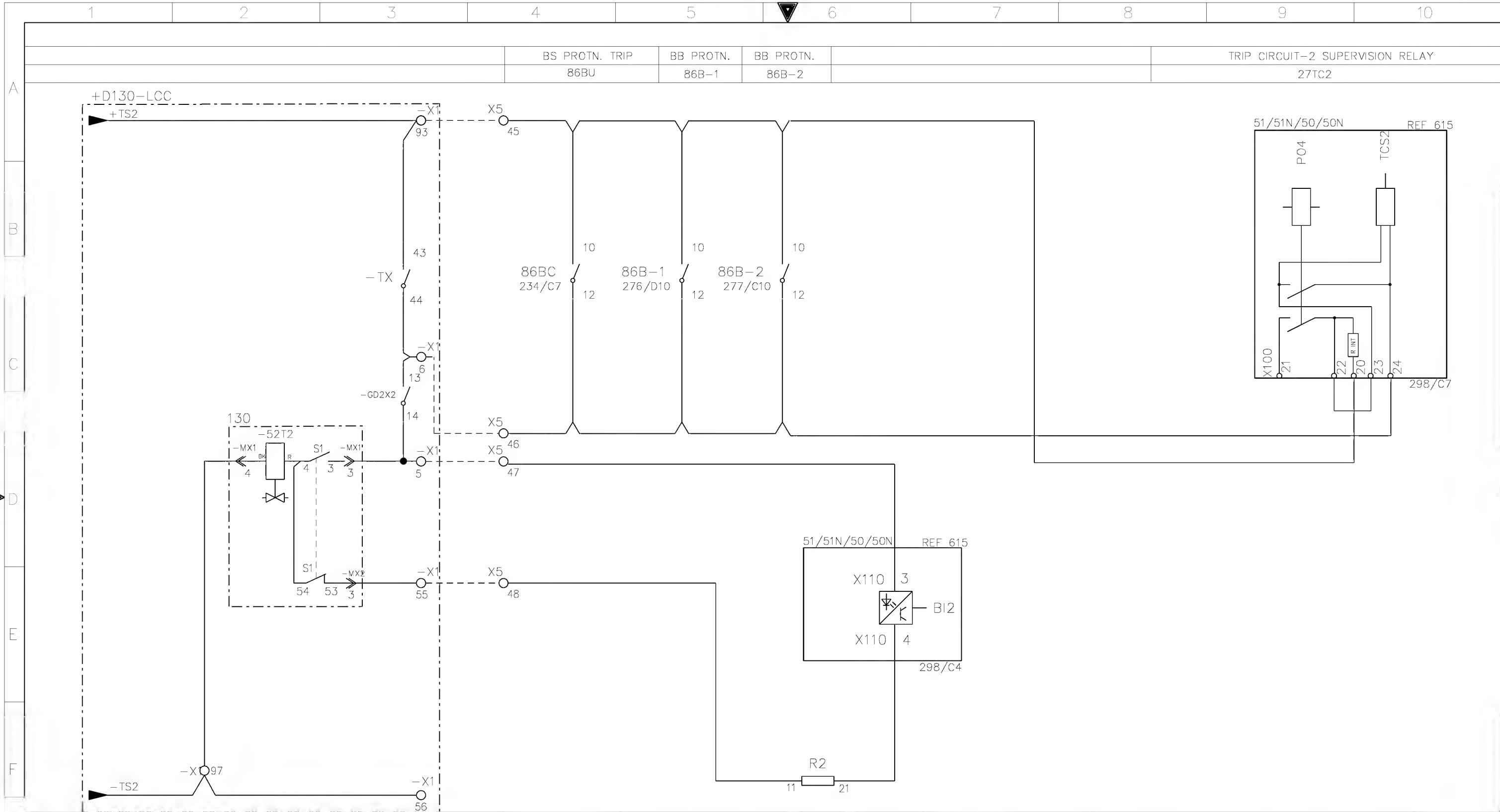
AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

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|----------|-------|-----------------|-------------------------|---------------------|
| 01 | 13 49 | FACTORY ASBUILT | DRAWN BY RIZ | CHECKED BY JKR |
| 00 | 13 04 | FOR APPROVAL | DATE STARTED 24.01.2013 | DATE COMPLETED |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | ENG. DEPT. AUT-PSAC |

TRIP CIRCUIT-1 SUPERVISION CIRCUIT
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
National Grid sa

| INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | REV. NO. |
|-------|-----------|----------------|-----------|-----------|
| - | C421 | CD-322946 | SHT 291 | CONT. 292 |
| | | | | 01 |

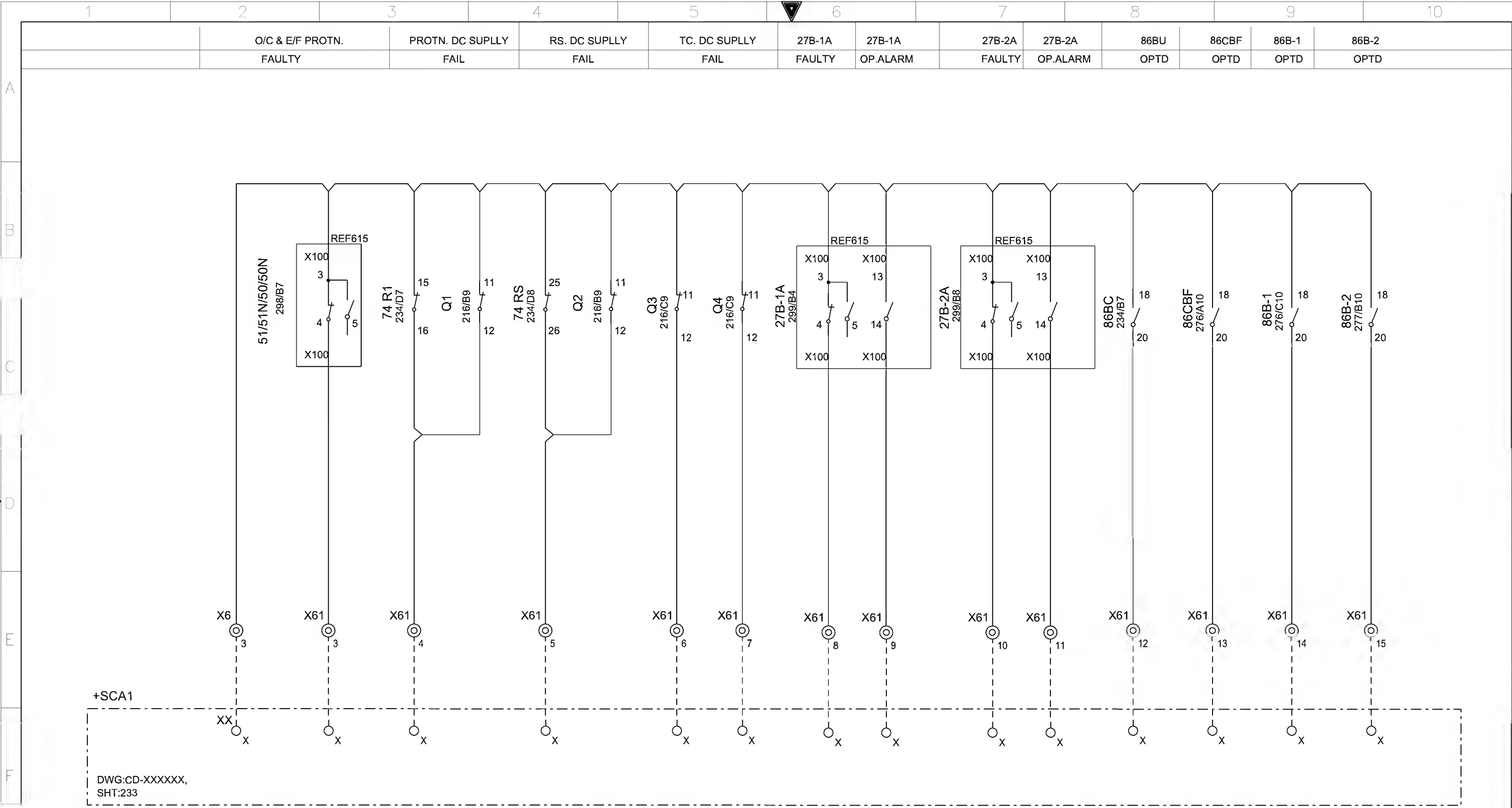



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SHT.XX

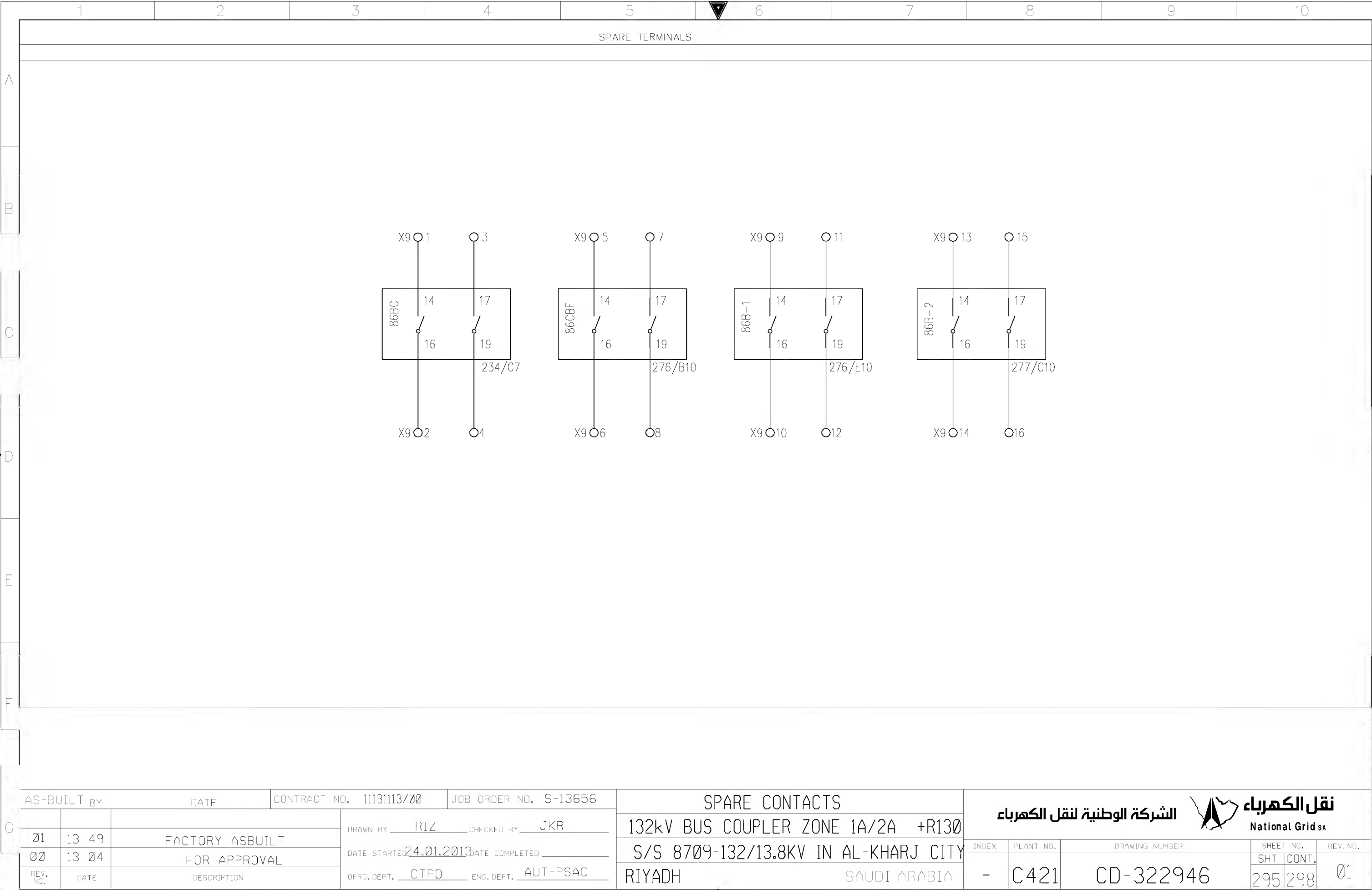
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|------------------------------|-------|---------------------------------|--------------------------|--|-----------------------|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | |
| 01 | 13 49 | FACTORY ASBUILT FOR APPROVAL | DRAWN BY RIZ | | CHECKED BY JKR | |
| 00 | 13 04 | | DATE STARTED 24.01.2013 | | DATE COMPLETED _____ | |
| REV. NO. | DATE | DESCRIPTION | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | |

TRIP CIRCUIT-2 SUPERVISION CIRCUIT
132kV BUS COUPLER ZONE 1A/2A +R130
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

| | | | | | | |
|------------------------------|-----------|---|--|------------------|-------|----------|
| الشركة الوطنية لنقل الكهرباء | |  | | نقل الكهرباء | | |
| | | | | National Grid sa | | |
| INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. |
| - | C421 | CD-322946 | | SHT | CONT. | 01 |
| | | | | 292 | 293 | |



| | | | | | | | | | | | | | | | | |
|------------------------------|--|--|-----------------------------|--|--|--|--------------------------------------|--|--|-----------|----------------|--|-------------------|--|----------|--|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | STN-COMMON ALARM CIRCUIT | | <div>الشركة الوطنية لنقل الكهرباء</div> <div>نقل الكهرباء</div> <div>National Grid sa</div> | | | | | | | |
| | | | DRAWN BY RIZ CHECKED BY JKR | | | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | | | | | | | |
| 01 13 49 | | | FACTORY ASBUILT | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. | |
| 00 13 04 | | | FOR APPROVAL | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | - | C421 | CD-322946 | | SHT 294 CONT. 295 | | 01 | |
| REV. NO. | | | DATE | | DESCRIPTION | | | | | | | | | | | |



AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

01

13 49

FACTORY ASBUILT

00

13 04

FOR APPROVAL

REV. NO.

DATE

DESCRIPTION

DRAWN BY RIZ

CHECKED BY JKR

DATE STARTED 24.01.2013

DATE COMPLETED

OPRG. DEPT. CTPD

ENG. DEPT. AUT-PSAC

SPARE CONTACTS

132kV BUS COUPLER ZONE 1A/2A +R130

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



National Grid sa

INDEX

PLANT NO.

DRAWING NUMBER

SHEET NO.

SHT

CONT.

REV. NO.

-

C421

CD-322946

295

298

01

NG/D2-D (2012/01)

DMS

VECTOR

NGD200

A

B

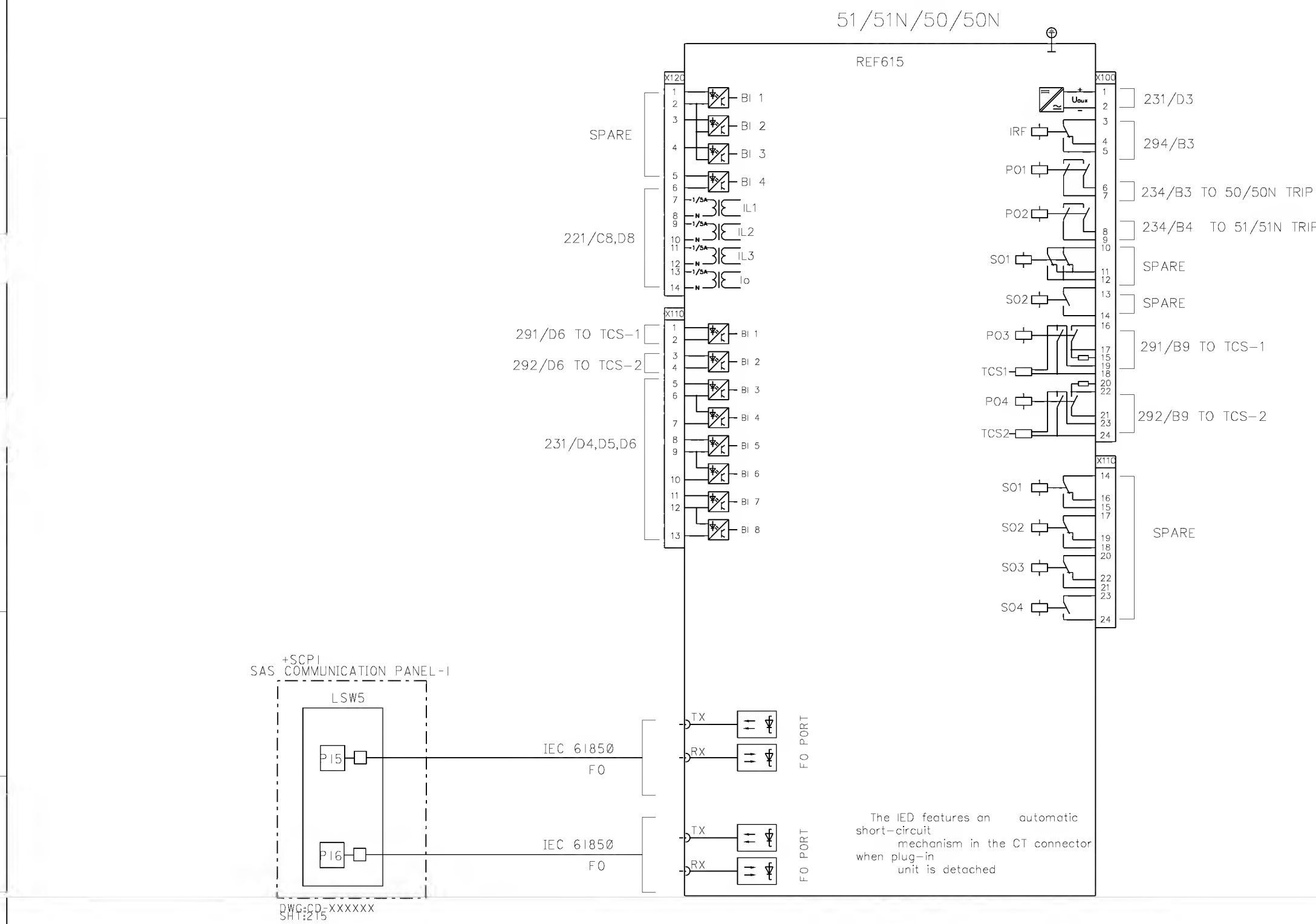
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D

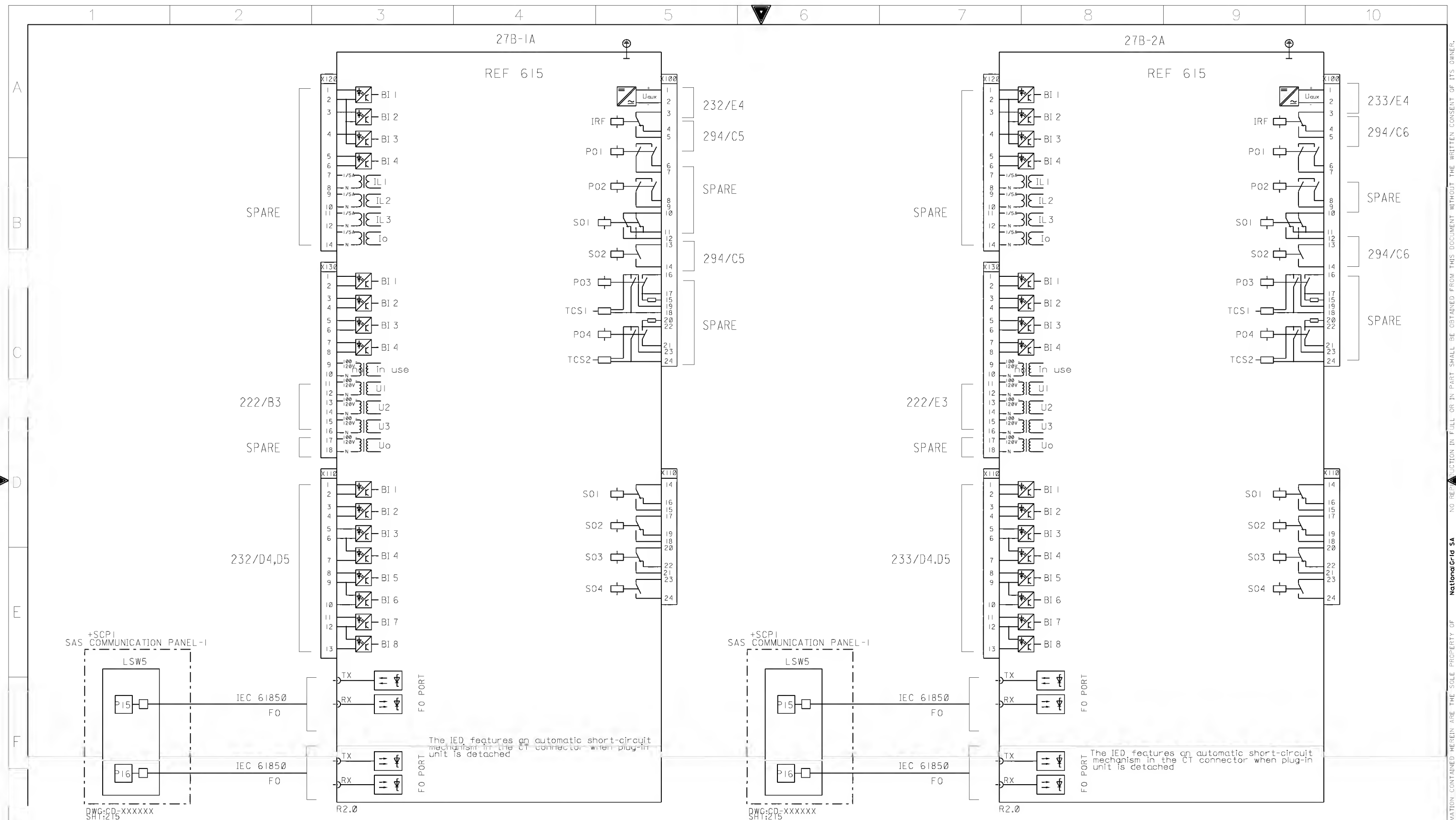
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|------------------------------|--|--|--------------------------|--|-------------------------|--|--------------------------------------|--|---------------------|--|-----------|----------------|------|-----------|-------|----------|-----|----|
| AS-BUILT BY _____ DATE _____ | | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | BLOCK REFERENCE | | | الشركة الوطنية لنقل الكهرباء National Grid sa | | | | | | | | |
| | | | DRAWN BY RIZ | | CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | | INDEX | PLANT NO. | DRAWING NUMBER | | SHEET NO. | | REV. NO. | | |
| 01 13 49 | | | FACTORY ASBUILT | | | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | | | SHT | CONT. | | | |
| 00 13 04 | | | FOR APPROVAL | | DATE STARTED 24.01.2013 | | DATE COMPLETED | | RIYADH SAUDI ARABIA | | | - | C421 | CD-322946 | | 298 | 299 | 01 |
| REV. NO. | | | DATE | | DESCRIPTION | | OPRG. DEPT. CTPD | | ENG. DEPT. AUT-PSAC | | | | | | | | | |



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|---|------------------------------|-------|--------------------------|--|--|--|--------------------------------------|--|---|-----------|----------------|-----------|-------|----------|
| G | AS-BUILT BY _____ DATE _____ | | CONTRACT NO. 11131113/00 | | JOB ORDER NO. S-13656 | | BLOCK REFERENCE | | <div>نقل الكهرباء</div> <div>الشركة الوطنية لنقل الكهرباء</div> <div>National Grid sa</div> | | | | | |
| | 01 | 13 49 | FACTORY ASBUILT | | DRAWN BY RIZ CHECKED BY JKR | | 132kV BUS COUPLER ZONE 1A/2A +R130 | | INDEX | PLANT NO. | DRAWING NUMBER | SHEET NO. | | REV. NO. |
| | 00 | 13 04 | FOR APPROVAL | | DATE STARTED 24.01.2013 DATE COMPLETED _____ | | S/S 8709-132/13.8KV IN AL-KHARJ CITY | | | | | SHT | CONT. | |
| | REV. NO. | DATE | DESCRIPTION | | OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC | | RIYADH SAUDI ARABIA | | | | | - | C421 | |

